ENGINEERING NEWS-RECORD

Ahead of the shield under Boston's harbor p.32

STEPHEN BUCE
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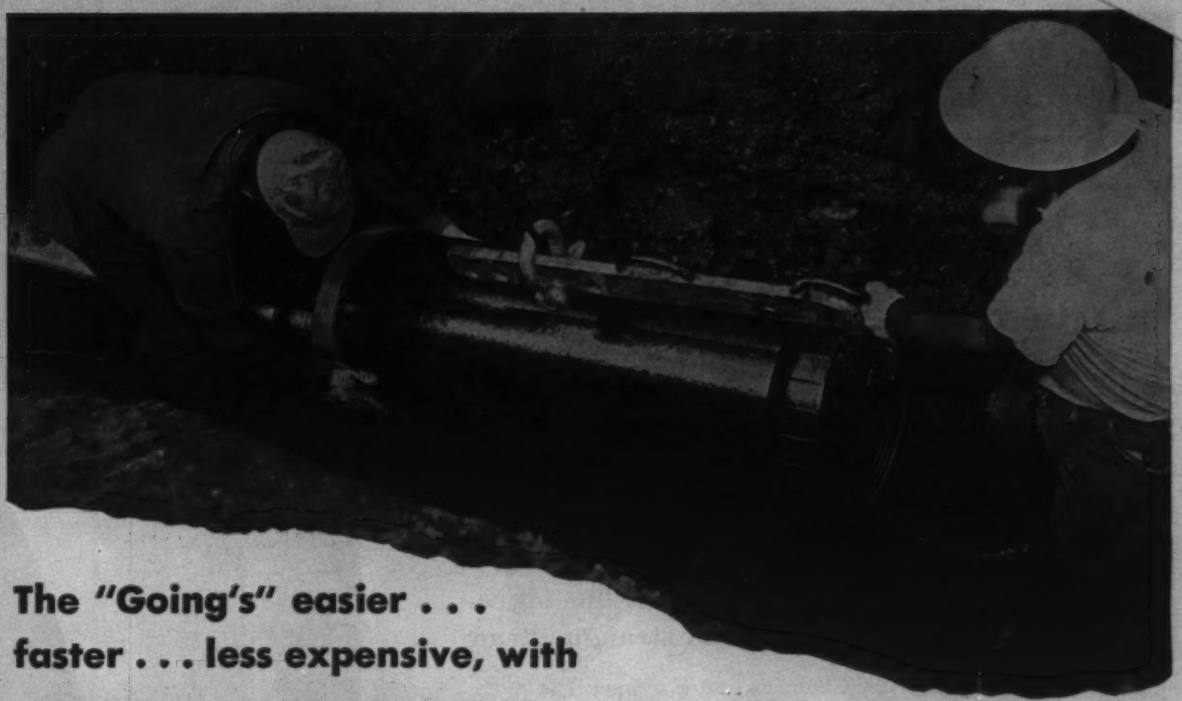

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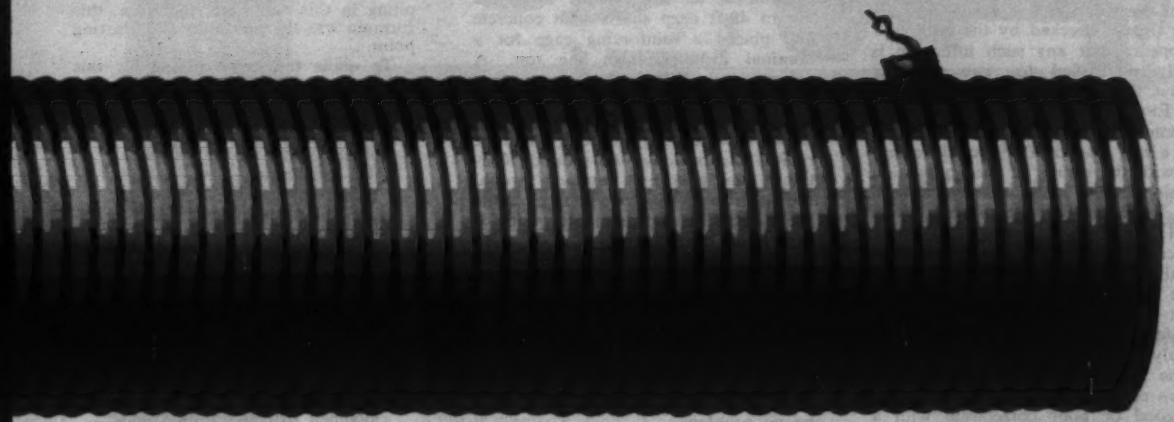

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Did Tests Prove Pile Formula?

Several readers challenge "Test Load on Large Piles" (ENR June 9, p. 50) and one of the engineers replies.

The readers say . . .

SIR—The inference of the article would appear to be that the results of employing of the ENGINEERING NEWS formula were closely checked by the load test. It appears that any such inference is wholly unjustified for two reasons:

First, the assumed factor of safety of the ENGINEERING NEWS formula as presented is 6, so it is difficult to see how a test load of 150% could correlate with the results of the application of this formula since we have a variance in factors being compared which could amount to 4 to 1.

Secondly, and more significantly, the actual factor of safety is determined to be *"at least* one and a half to one". What evidence is there that this factor of safety is not 10 to 1 or even higher?

Only if the load test were carried to the point of yield of the pile-soil system could one be justified in claiming good or poor correlation with a pile driving formula. Otherwise, such inferences become mere prejudices or preferences rather than sound engineering opinions.

The relation of the actual static bearing values of piling to the calculated values obtained through the employment of dynamic pile driving formulae is at best a highly controversial subject. It would not appear to be in the interests of good engineering practice to present the results of three load tests on a single job, incomplete tests at that since loads were not carried to yield, with the inference that here was proof of the formula's accuracy and reliability. Any formula is, at best, only a useful guide and should be used with caution and judgment. Where economically practical or where maximum reliability is essential, load testing, preferably to yield, should be used to adjust formula results.

T. M. LEIGH
Development Engineer
Link-Belt Speeder Corp.
Cedar Rapids, Iowa

SIR—The article seems to me very misleading since it was stated that the piles were set in pre-drilled holes and only the last few feet were actually driven. This is certainly not the case for which the ENGINEERING NEWS formula would ordinarily apply. Obviously, the piles are end-bearing piling with the maximum depth of penetration into the glacial till not exceeding five feet.

However, of real interest in bridge construction was the use of piles as column sections projecting out of the ground. It would seem to me more economical to have simply filled the 30- to 40-ft deep shafts with concrete and placed a reinforcing cage for a nominal distance from the top. A column could then be built from there up in the normal manner. Considerable research has been done which shows that bending moment would be rapidly dissipated in the ground. Certainly, the maximum moment would not occur more than five feet below the ground surface and moments would be very small beneath this.

Very economical bridge piers could thus be built where the drilled piers are feasible. Where the work is done near existing roads, railroads, sewers, streams, etc., even greater cost advantages can be secured. The completed structure would function exactly the same as these piers, so design should be no problem.

By eliminating the heavy unnecessary concrete piles, no equipment would be needed which is not readily available throughout the U. S., and this would save money, allow closer tolerances, and possibly a more attractive structure.

HARRY SCHNABEL, JR.
Schnabel Foundation Co.
Washington, D. C.

SIR—It is quite hard to see how a formula is substantiated because it is on the side of safety. Studies have shown that formulas usually hailed as successful did not work out too well when exposed to the check of tests carried to failure.

Just because a certain code gives an acceptable maximum settlement under a 50% overload, we do not have the license to extrapolate a factor of safety. It would have been most interesting and useful to know the failure load of the given pile.

S. C. SCHIFFE
Paris, France

Here's the reply . . .

SIR—In view of some of the wording in the article, I am inclined to agree with Mr. Leigh of Link-Belt and Mr. Schnabel that there might well be some concern from an engineering standpoint about procedures described. Actually the project was developed on the basis that no pile driving formula presently in use would adequately serve for the driving of 48-in. concrete piling and, therefore, the three test piles driven as the first order of work were for the sole purpose of developing a proper driving formula. The ENGINEERING NEWS formula is used by specification for all conventially driven foundation piling in this one state; therefore, this formula was the one used as a starting point.

To quote the specifications for this project:

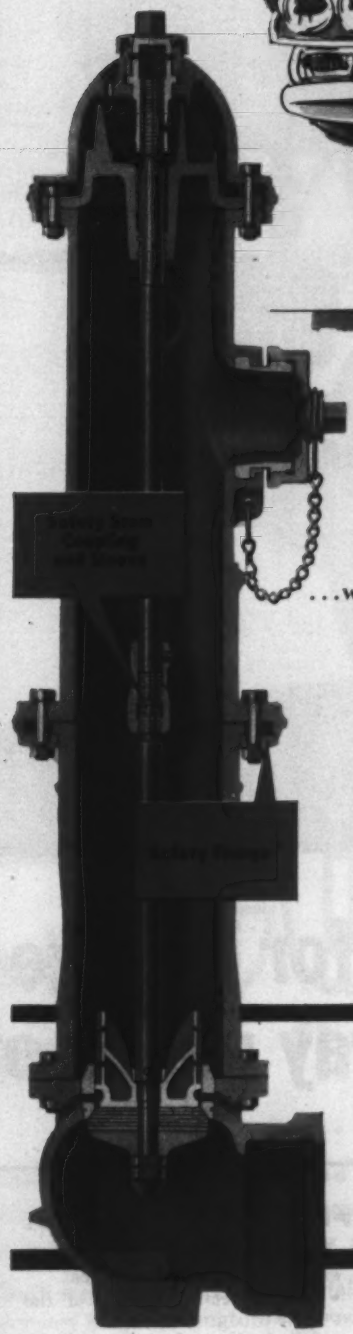
> "The first test pile shall be driven to a load bearing capacity of 260 tons as determined by the Engineering News formula. Before driving the second test pile, the driving formula shall be tested by applying a test load to the first test pile . . . and the driving formula shall be modified, as directed by the engineer, for the driving of the second test pile.
>
> "The second test pile shall be driven to 260 tons bearing capacity as determined by the modified driving formula. The second test pile shall then be test loaded and the formula modified again, if necessary, for the driving of the third test pile and for the driving of the permanent piles."

By driving the first test pile to a load-bearing capacity as determined by the ENGINEERING NEWS formula, we found that no modification was necessary, unless it might have been relaxation, since the pile actually took a test load of 150% of design load without significant settlement. In view of the fact that the formula provided a factor of safety of 1½ for all three test piles, it was decided to utilize it as it stands for the driving of all piling on the project.

In this regard Mr. Leigh is correct in his assumption concerning the factor of safety. All we have done is to insure a factor of safety of 1½, which is considered adequate by most foundation specifications.

(*Reader Comment continued p. 13*)

Engineering News-Record welcomes expression of opinions from its readers. Comment should be as chief as possible and pertinent to subjects of current instruction importance. Letters should be addressed Editor, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.



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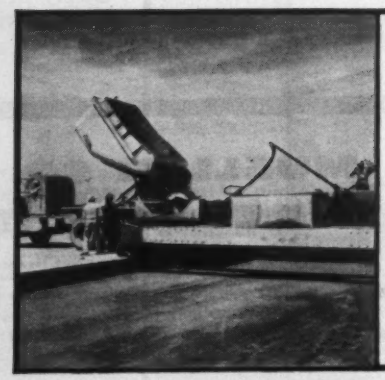

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. . . Reader Comment

Reference in the article to glacial till is only partly correct. Actually, more than half the site is an old creek bed. This portion contains low bearing capacity soft clay and sand averaging approximately 20 ft in depth, but in places going as high as 30 ft in depth. This soft material overlays a very hard and firm clean sand foundation. The north edge of the creek bed consists of a glacial till deposit of undertermined depth.

In view of the depth of soft material over the major portion of the site, the pouring in place of reinforced concrete shafts as suggested by Mr. Schnabel would be impractical in this particular case.

The drilling of holes for the placement of the piles was carried only to such depth as necessary to position the piles and to insure proper alignment during driving. In many cases the piling have been driven from 15 to 20 ft through the soft material to reach the firm foundation.

In regard to economy for this type of construction we find that the contractor's bid price provides a structure at a unit cost of $9.58 per sq ft of roadway surface; whereas conventional cast-in-place structures in this area would cost from $11 to $12 per sq ft of roadway surface.

G. H. ANDREWS
Urban Bridge Engineer
Washington State Highway Dept.

Fall River Bridge

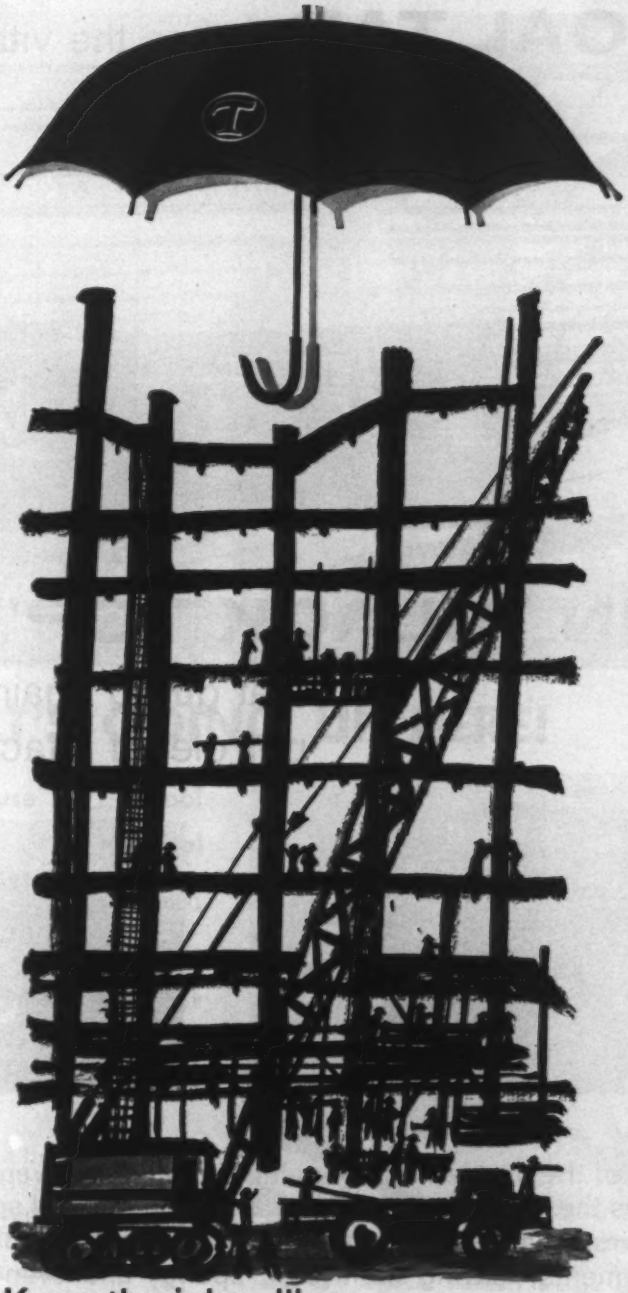
SIR—Your article "Bay State's Largest Bridge" (ENR Aug. 11, p. 30) described the difference of opinion concerning the location of the proposed bridge which will span the Taunton River between Fall River and Somerset, Mass.

The preliminary studies which established the location were made by another firm of consulting engineers under contract to the Massachusetts Department of Public Works. We did not participate in this study, but are familiar with the alternate locations and in our opinion the present site is a practical solution to a complex problem.

Our contract is for the detailed design of the structure, and the through cantilever truss design was selected because of its economy and appearance. We are proud of our participation in this phase of the project.

E. PICHEL, PRESIDENT
E. Pichel, Inc.
Consulting Engineers
New York, N. Y.

Editor's Note: The criticism quoted in the article related only to the bridge location and not to its design. The location being used was chosen as best by the Massachusetts Department of Public Works after it had made a careful study of all other possibilities and proposals.



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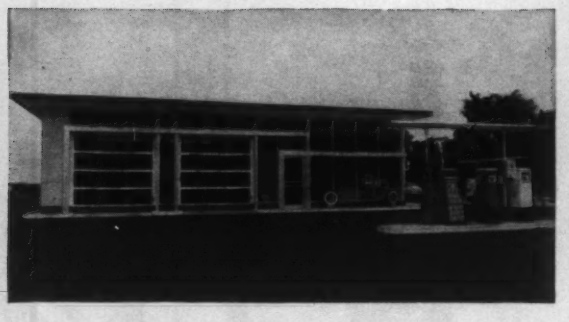

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One of the problems of popular bituminous pavements is their porosity: water penetrates the surface, stripping away the binder and spalling the pavement when freezing occurs. And distilled petroleum products act as solvents on some types of bituminous pavements, leaving them soft, spongy and even more vulnerable to water attack. • Koppers Pavement Sealers, because of their principal component, coal tar, are totally immune to water *and* to petroleum solvents; give bituminous pavements a tight, smooth protective layer that beautifies, too. • Rubberized types, meeting the latest Federal and Air Force specifications, resist jet blast and are almost a "must" for aprons and taxiways. But you needn't be in airport construction to find these sealers useful: parking lots, truck terminals, city streets, driveways; all bituminous pavements can be given extended life with Koppers Pavement Sealers. Write or call your Koppers District Office for more details and literature.

KOPPERS TAR PRODUCTS DIVISION, PITTSBURGH 19, PA.

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GUESS WHAT'S GOING UP HERE!

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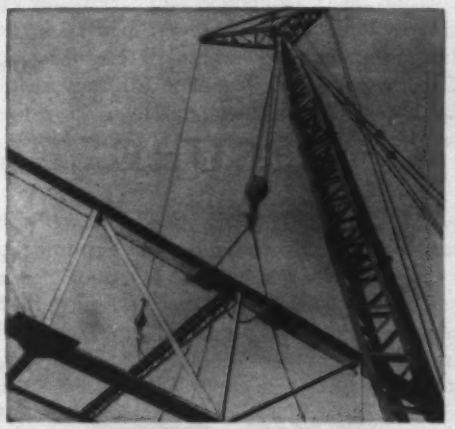
☐ Factory ☐ Store ☐ Hospital

Happens to be a school building, but any other guess would be no reflection on your good judgment.

For Sheffield Open Web Steel Joists speed construction and cut costs in *every* type of building. Versatility is their middle name. They come in longspan and shortspan sizes. Their structural and design possibilities are as high, wide and handsome as the imaginations of architects, engineers and contractors.

Sheffield Steel Joists combine strength and light weight for any type of floor, roof and ceiling. They're quickly installed and furnish support for a working platform right away. The underslung, open web design allows fast placement of pipes, conduits and ducts. Other trades can begin work promptly. The need for slow, expensive falsework is eliminated entirely. And the light weight of Sheffield joists makes possible lighter construction of columns, walls and foundations with full strength rating.

Learn more about how these advantages can be turned to your benefit. Get in touch with your nearest Sheffield office.



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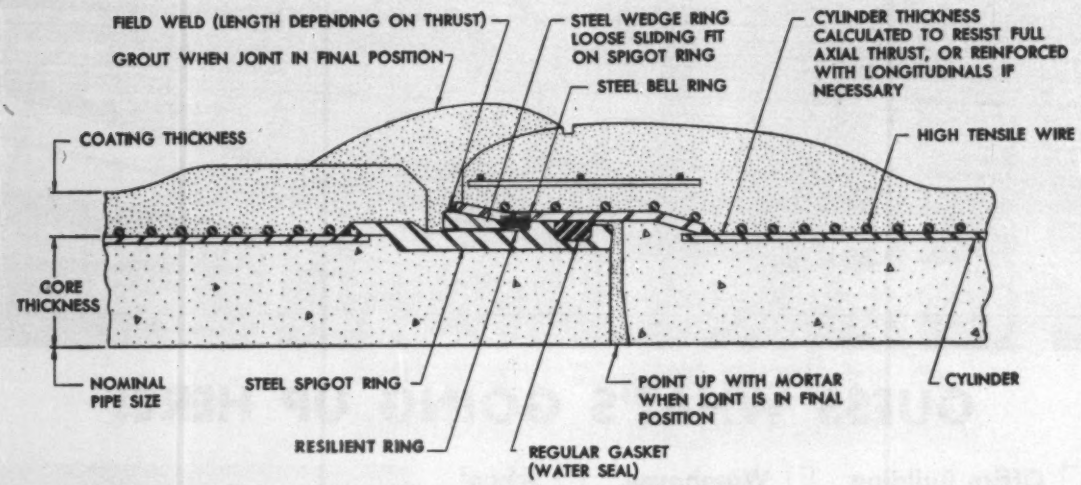
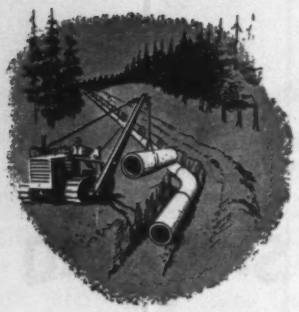
LOCK JOINT'S FLEXIBLE TIED JOINT *


FIELD WELD (LENGTH DEPENDING ON THRUST)
GROUT WHEN JOINT IN FINAL POSITION
STEEL WEDGE RING LOOSE SLIDING FIT ON SPIGOT RING
STEEL BELL RING
CYLINDER THICKNESS CALCULATED TO RESIST FULL AXIAL THRUST, OR REINFORCED WITH LONGITUDINALS IF NECESSARY
COATING THICKNESS
HIGH TENSILE WIRE
CORE THICKNESS
NOMINAL PIPE SIZE
STEEL SPIGOT RING
POINT UP WITH MORTAR WHEN JOINT IS IN FINAL POSITION
CYLINDER
RESILIENT RING
REGULAR GASKET (WATER SEAL)

RUBBER & STEEL FLEXIBLE TIED JOINT

SECURE...FLEXIBLE...WATERTIGHT



Lock Joint Pipe Company, pioneer in the development of efficient, flexible, watertight joints for concrete pressure pipe, once again is first with the most practical solution for restraining thrust at joints where conventional blocking is impossible or impractical.

A greater measure of flexibility is imparted to this field-welded joint by the resilient ring, located between the weld and the watertight rubber gasket seal. This ring also improves the tensile characteristics of the joint by distributing the load more evenly around the periphery of the joint ring.

Detailed description of this joint may be obtained from Lock Joint Pipe Company on request.

**Patent applied for.*

LOCK JOINT PIPE CO.

East Orange, New Jersey

Sales Offices: Chicago, Ill. • Columbia, S. C. • Denver, Col. • Detroit, Mich. • Hartford, Conn. • Kansas City, Kan. • Perryman, Md. • St. Paul, Minn. • Winter Park, Fla.

Pressure • Water • Sewer • REINFORCED CONCRETE PIPE • Culvert • Subaqueous

ENGINEERING NEWS-RECORD

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Back issues of ENGINEERING NEWS-RECORD *are generally available for the previous six months. Semiannual indexes will be sent on request.* ENGINEERING NEWS-RECORD *is also indexed in Industrial Arts Index and Engineering Index.*

THE CONSTRUCTION WEEK

WELL DONE—A letter went to local sections and fund-raising personel of the American Society of Civil Engineers last week congratulating them on a job well done. Contributions in August put ASCE members over their $800,000 quota of funds for the United Engineering Center, into which the New York-based societies will move next fall.

INDUS DISPUTE ENDS—With the World Bank moderating final negotiations in Washington, India and Pakistan have come to terms on the division of water in the Indus River Basin. The formal end of the 12-year dispute is expected September 19, when Prime Minister Nehru journeys to Karachi for the treaty signing. Construction needed to implement the agreement includes at least two big dams and several hundred miles of canals linking the tributary watersheds.

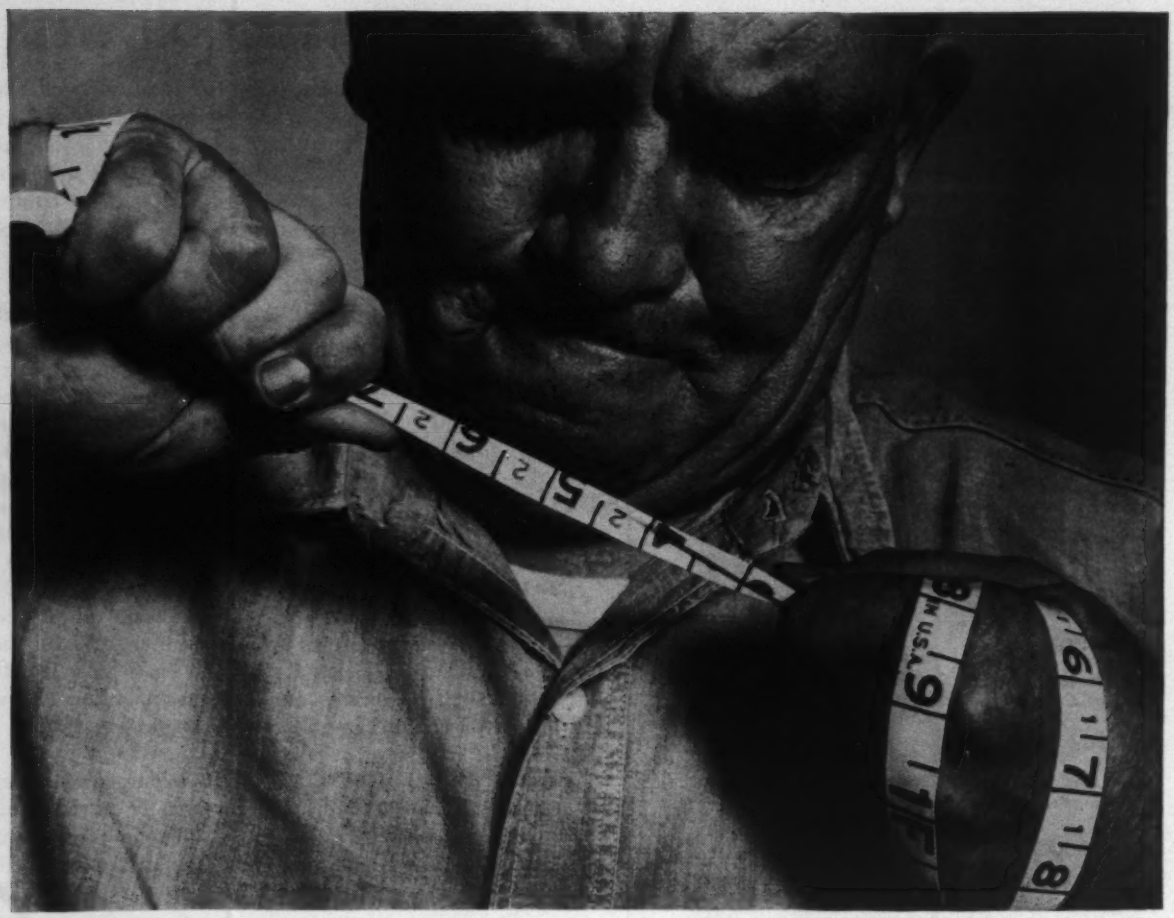
BORINGS—AREN'T LANDINGS—The Port of New York Authority this week has permission of 19 New Jersey residents to take borings on their land for the 220-million jet airport it hopes to build on a 10,000-acre site in Morris County. Local opposition—at the root of PYNA's troubles with Congress—persists.

CHICAGO HOUSING BUNDLE—Chicago's housing authority will receive bids September 27 on the 1,262-unit first phase of a new $75-million public housing development for 4,415 families. Bid invitations on the second phase for 1,261 units will go out September 20. On October 11, invitations will go out for the final section of 631 units. The remaining 1,261 units will go out for bid next year.

CALIFORNIA WATER CHIEF QUITS—Harvey Banks, California's water resources director, will leave his state job January 2 to become a vice president of Leeds, Hill & Jewett, Los Angeles consulting engineer firm. His departure makes a clean sweep of the department's top echelon. Ralph Brody, deputy director, and Walter Schulz, head of design and construction, are also resigning.

STRIKE STARTS TO HURT—Contractors in the Midwest are already feeling the effects of the strike on the Pennsylvania Railroad. It has forced shut a lime and a concrete plant of Chicago's big Material Service Corp. Although other MSC plants remain open, the company has been forced to turn to truck delivery, which costs about 30% more than rail shipment.

FASTER AND FASTER—Denton Construction Co., Grosse Pointe, Mich., has shattered its newly established world record for speed in concrete paving (ENR Aug. 18, p. 17) by laying 8,036 ft of 24-ft-wide, 9-in.-thick pavement in one 12-hour working day. Old record was 7,250 ft.



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You can't hurt Lufkin "Hi-Line" woven tape!

Prove it for yourself! Take Lufkin's Hi-Line tape and use it, *abuse* it, and use it again. It's woven from tough, new, miracle fibers that give you more strength and durability per inch than any other nonmetallic tape!

In addition to sheer strength, the Hi-Line features long-lasting black markings that penetrate deep into the fibers . . . and *instant* reading (preceding foot number is repeated every inch of the way). Special plastic coating resists abrasion and temperature changes; won't absorb moisture. And the Lufkin Hi-Line is *heat set* to length, to very close tolerances. Up to 150′ lengths.

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Measure for measure, the finest made . . .

LUFKIN

SAGINAW, MICHIGAN

WASHINGTON OBSERVER

- **Congress passes housing 'musts'**
- **Business spending predictions down**
- **Air Force gets a labor consultant**

● **Congress managed to take care only of rock-bottom housing needs before going home.** The omnibus housing bill will have to come up as an early item of business next year.

Congress gave HHFA $500 million in additional lending authority for college dormitories. This is enough to take care of slightly more than the 251 applications pending for $310 million worth of construction.

Community Facilities Administration gets $50 million for loans to communities that find it difficult to find private financing for waterworks, sewers, gas systems and the like.

FHA insurance of home improvement loans was extended for another year. Otherwise it would have expired on October 1.

This minimum package squeaked through at the last minute leaving behind programs to beef up such things as urban renewal, public housing, housing for the elderly, cooperative housing for middle income families, additional money for Fannie Mae, plus some additional authority for FHA mortgage insurance programs.

—

● **Businessmen are now more cautious about spending for new plant construction and equipment replacements this fall.**

According to the government's latest survey, businessmen have dropped their sights for the fourth quarter. On a seasonally adjusted basis, capital spending is now predicted to total about $37 billion at an annual rate—the same as predicted for the current quarter. In actual dollars, $9.9 billion is slated in the coming three months.

Manufacturing is the only industry scheduled to begin actually cutting expenditures.

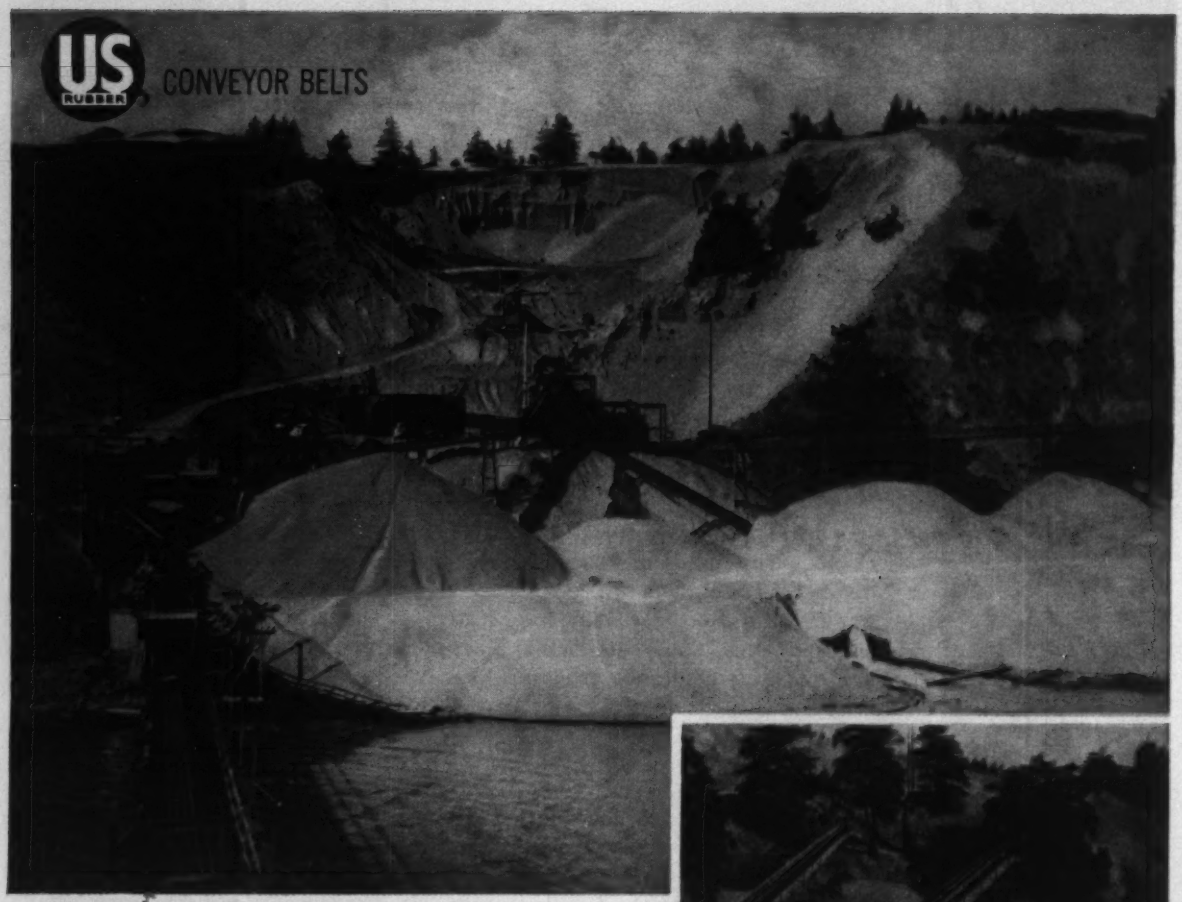
Though overall spending has levelled off, the figures actually represent a cutback of 2% from what businessmen had anticipated six months ago. Government economists are concerned that this foreshadows a further cutback next year and possible widespread business readjustments.

—

● **In the latest maneuvering on missile bases,** retired Corps of Engineer Col. Clarence Barker, an aide to Labor Secretary Mitchell, shifts to the staff of the Secretary of the Air Force as labor relations consultant. He will concentrate on the Air Force missile base program particularly. Earlier, insiders had expected Col. Barker to become an on-the-spot trouble shooter for Secretary Mitchell. Now he will work with General Thomas Gerrity, the Air Force missile czar.

The Air Force is anxious to adapt to its own needs the kind of labor relations policy that the Atomic Energy Commission has been practicing for several years. Contractor representatives say that the AEC has been outstanding in avoiding the thorny jurisdictional problems that have plagued the missile bases.

This latest move strengthens the hand of the Air Force in dealing with labor problems at the missile sites.



Overall view of plant showing huge mounds of sand conveyed by U. S. Giant "EN" cotton-nylon belts.

Close-up of gravel surge piles and two U.S. Giant "EN" conveyor belts.

U.S. Belts cement profits for contractor and sand-gravel men

In the latter half of 1958, sand and gravel were required to build a breakwater in the bay of Bellingham, Washington. The successful contractor would have had to barge this from the nearest source, 100 miles away.

However, local men in the concrete-products business, always in need of sand and gravel, knew of a sizable deposit nearby. If only they could work this deposit, furnish the contractor with material at a considerable saving to him in time and money and end up with a plant to supply their own and local needs!

The capital outlay would have been prohibitive unless material-handling costs were cut to the bone. U. S. Rubber was brought into the picture to design a conveying system to meet these needs.

Ten conveyor belts were erected for the plant. Each was equipped with U. S. Rubber's Giant® "EN" cotton-nylon belts. They far exceeded in load-carrying capacity and high rip resistance any belt of conventional duck construction.

The plant utilizes the following belt conveyors:

1420 feet 18" 4-ply TN, ⅛" x 1/32" covers
1875 feet 30" 5/EN, ⅛" x 1/32" covers

These belts have more than fulfilled expectations. They conveyed the thousands of tons of sand and gravel needed to complete the breakwater. This was in 1958... and so far are continuing to carry thousands of tons of sand and gravel for local needs to customers in a 75-mile radius, including Port Angeles, Port Townsend, Anacortes, Wash., and Vancouver, B. C., Canada, thereby repaying the investment.

All of which proves again that "U.S." is the foremost authority in conveying materials by belts.

Mechanical Goods Division

United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.

More business because . . .

- Plans for future construction are soaring.
- There'll be more capital available at better rates.
- Federal aid for highways is on the increase.
- Rising revenues will spur local public works.

And more profits because . . .

- Costs are steadying as inflation ebbs.
- Bid prices will improve.
- And faster contracting schedules will save on costs.

In '61: More Work, More Profit

The profit outlook for construction men in '61 is the brightest since 1956. Next year should see the industry climb out of the "profitless prosperity" that has frustrated many contractors during the three and one-half years from 1957 through the first half of 1960.

Sluggish contract awards clouded the early months of this year; but in the second quarter, the silver lining peeked out. By the beginning of 1961, the outlook for business and profits in the construction industry should turn to pure gold.

Regardless of which party wins the November elections, the die is already cast for new construction business in 1961. The tremendous upsurge in new plans for future construction in the last two years—a 22% jump in '59, plus a 28% climb in the first eight months of this year over last—has already put in motion a record boom in heavy construction contractors' new business.

Contracts to date are up 11% over last year and they should hold on to this gain for the full year. ENR contract awards will probably rack up a thumping $22.7 billion for 1960. This new record would be fully $1 billion more than ENR forecast at the beginning of the year (ENR Jan. 28, p. 55). Thus 1960 is the first year to pull ahead of the old record set in 1956 ($21.7 billion.)

With contract volume this year 26% higher than in 1957's contract recession and 18% greater than the "recovery" year, 1958, it's obvious that contractors are bidding in a much healthier market.

Competition remains keen, but it's not so rough now as six months ago. This is reflected in bid price indexes for highway and heavy construction, which will be covered in detail in ENR's third Quarterly Cost Report coming in the September 22 issue.

But 1960's increase is merely a stepping stone to the still higher volume of construction contracts to be let in 1961.

ENR forecasts that next year will see a continuing increase in projects moving out of planning financing and into contract. Awards should rise at least 3% in '61 and chalk up a new all-time high of $23.4 billion.

A check of the prospects for major types of work shows a faster buildup of plans this year than last for nearly every category of heavy construction.

With potential demand burgeoning, the main question remaining is whether the financing will be available in quantity and at a cost favorable to starting construction in 1961. For the availability of capital is the key to getting projects off the drawing board. There's cheer, then, in the definite evidence that enough money will be available at favorable rates to foster at least a 3% rise in contracts next year.

Major influences working in favor of construction borrowing in '61 are (1) prospects of a balanced federal budget in fiscal '61; (2) reduced pace of corporate long-term borrowings due mainly to record depreciation reserves and after-tax profits; and (3) a greater supply of mortgage money from savings and loan associations, insurance companies and possibly "uninsured" pension funds.

The downturn in long-term borrowing costs early this summer, followed last month by reductions in the Federal Reserve Bank discount rate and commercial banks' prime rate, bring rates substantially below the relatively high rates prevailing late in '59 and early '60. In addition, there are scattered reports of slight reductions in interest rates on conventional mortgages in a few parts of the country, and smaller discounts on government-insured mortgages in some areas.

Though the current decline in interest rates accompanying the tapering off in aggregate demand for capital may reverse itself by mid '61, borrowing costs of long-term capital probably will not return to their late '59-early '60 highs. Coupled with the prospect of more favorable borrowing cost in '61 is the improved outlook for the supply of new construction capital. State and local agencies, private businesses and individuals will probably find less competition for money within the 1961 capital market. And they can expect a more generous mood among investors, who will be more affluent.

Contractors will benefit from somewhat lower interest charges and more readily available construction loans from banks in '61. Last year's heavy pressure on banks for loans to finance the rapid inventory buildup, most dramatic in steel, subsided in 1960 as industry reduced its inventory accumulation rate. No resumption of a rapid inventory buildup is in sight for the balance of this year or early '61. Moreover, banks in New York and Chicago are allowed, starting this month, an increase in the loans-to-deposits ratio, which will

. . . Government construction spending will stay strong

permit them to make hundreds of millions of additional business loans when credit demand increases. So contractors are probably going to pay a little less for working capital, be able to get close to what they need for 1961 operations.

Prospects are even brighter for new public construction funds available from taxes. The increased federal gas tax (enacted in 1959) has bolstered the Highway Trust Fund to the point where the Bureau of Public Roads will eventually provide about a 16% increase in federal aid for highway construction in fiscal 1962 compared with fiscal '61. Fiscal '62 begins in July of next year so that contracts for Interstate and ABC highway and bridge contracts let in the second half of next year should reflect the increased flow of federal money. Because most of the fiscal '62 money has already been apportioned, state highway departments can plan their 1961 contracting schedules well in advance—in sharp contrast to the situation in mid-'59 and again this year.

Prospects of a balanced budget for fiscal '61 have been followed by a shift in Administration policy with respect to new starts on federal projects. This summer, several hundred million dollars worth of new federal buildings in the planning stage were given new life. Between now and the end of next year, contractors should see a substantial increase in this source of new business. In addition, Congress passed last week a public works appropriation bill for fiscal '61 providing money for a large number of new starts on federal river and harbor, reclamation and other water resources development projects. Though the bill includes many more new starts than the Administration's budget request, it's expected to become law.

Thus these three major areas of federal support for the construction industry in '61 are already in motion—highways, buildings, Corps of Engineers civil works and Bureau of Reclamation projects. Their impact on the first half of 1961 isn't likely to be diluted by the outcome in November. Moreover, the current Administration will present the 1962 fiscal budget to Congress next January, leaving relatively little time for making major changes in federal construction appropriations in these three areas. There could be new programs instituted for fiscal '62 that would increase the federal government's contribution to the total construction market. Two areas—school construction aid and housing—might be in for another round of debate and possibly action next spring.

But ENR's forecast makes no guesses on such new programs, nor on any radical change that might be made in existing programs. Both parties platforms indicate, however, that any such shift is likely to favor a slightly higher volume of federal construction in 1961 than ENR predicts.

At the state level, tax revenues jumped 13.7% to a record high in fiscal 1960 as state receipts reflected the rebound in the economy from the 1957-58 recession. With local taxes probably continuing to parallel the states' trend—at least in direction if not in degree—the rise in revenues will underwrite an expansion of state and local public works in 1961. The renewed vigor of the economy in 1959 stimulated public works planning at the local level. These projects have begun to move into contract in increasing volume since last spring. Next year, state and local construction should climb briskly.

One of the most crucial questions on the outlook for water resource development projects, including dams, will be decided in November by California voters. On the ballot will be the proposed $1.75-billion bond issue to finance the state's huge Feather River project. Prospects of passage are uncertain, and ENR's forecast includes no part of this 10-year project. However, approval of the bond issue could add $100 million or more to the Earthwork-Dams-Waterways contract forecast.

Shifting to the private heavy construction market, prospects look good for a substantial hike in commercial building to a new record next year. And mass housing will probably rise above this year's sharply improved volume. But the outlook is not as bright for industrial building and private "unclassified" construction.

Industrial building contracts are on the upgrade now and should remain strong until the spring of '61 when weakness may develop. This possibility arises from the June and July slowdown in new proposed plants, a slowdown that would normally take six to nine months to show up at the contract stage. Moreover, the cyclical pattern of the industrial building market in the past 11 years indicates that a downturn in contracts may come around mid-'61 if the pattern of the past holds for the future.

Yet August proposed industrial plants shot up to the highest in over four years. However, one month doesn't make a trend. The volume of new proposed plants in the next two or three months will provide a firm indication

Heavy Construction Contracts Forecast (in millions)

50 States	1959 Actual	1960 Estimate†	Change '59–'60 %	1961 Forecast	Change '60–'61 %
All Heavy Construction	$20,433	$22,665	+11	$23,400	+ 3
By Ownership					
PRIVATE	10,431	12,200	+17	12,100	− 1
PUBLIC	10,002	10,465	+ 5	11,300	+ 8
State & Municipal	7,170	7,755	+ 8	8,400	+ 8
Federal	2,832	2,710	− 4	2,900	+ 7
By Type of Work					
PUBLIC					
Waterworks	376	435	+16	475	+ 9
Sewerage	655	680	+ 4	735	+ 8
Bridges*	570	765	+34	790	+ 3
Highways	2,899	3,380	+17	3,880	+15
Earthwork, Dams, Waterways	915	850	− 7	950	+12
Buildings:					
Excl. Housing	2,604	2,300	−12	2,600	+13
Housing	391	520	−12	440	−15
Unclassified	1,404	1,535	+ 9	1,430	− 7
PRIVATE					
Buildings:					
Mass Housing	4,701	5,500	+17	5,800	+ 5
Commercial	2,161	2,450	+13	2,700	+10
Industrial	3,003	3,400	+13	3,000	−12
Unclassified	554	850	+53	600	−29

† Based on 8 months actual awards.
* Includes private bridges.

on which to hang a forecast for '61 industrial building. ENR's best estimate at this time is that next year's contracts will be off about 12% from this year (which was probably swelled by some $200 million to $300 million worth of plants held up by the 1959 steel strike).

The shrinkage of corporate profit margins in 1960—while after-tax profits seem assured of setting a new high by a narrow margin—will probably serve to pinpoint industry's attention to replacing or modernizing inefficient plants and on building plants to produce new products. This may help explain trends noted in 1960: The average industrial building awarded was valued about 10% less than plants let in the 1959 period, according to ENR contract awards; while contract volume through August was off slightly from last year, the number of contracts rose 6%.

This year's booming gas pipeline construction pushed the private "unclassified" category of awards up. But next year will probably see substantially fewer new pipeline awards, thus pulling the overall category down.

More new business alone wouldn't necessarily increase the profitability of contractors' operations in 1961. But the substantial improvement this year and next should provide enough work to ease the cut-throat competition that has made many types of work unprofitable in the last couple of years.

Moreover, the cost push is under close "control." Material prices are down or steady and equipment list prices are barely rising, on the average.

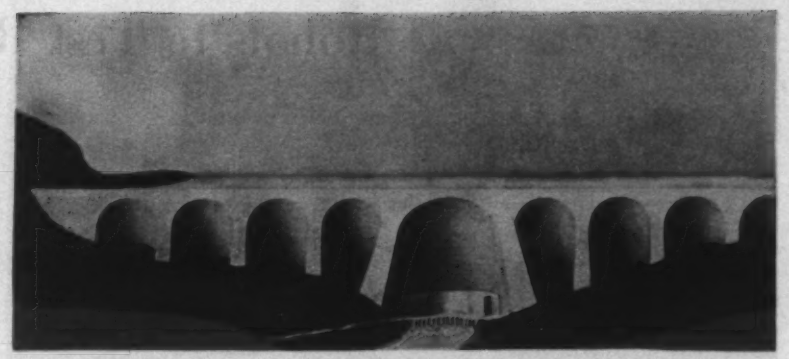
Wages continue to rise at a fast clip, but at least contractors can figure pretty closely what future wage increases will be because so many long-term labor contracts have future wage hikes written in. Ready availability of construction materials, manpower, machinery and money will make it possible for contractors to stick to fast construction schedules and thus save costs. Because so many of the unions in major construction markets signed new long-term contracts in '60, next year may see much less time lost due to strikes than in '59 or '60.

Catwalk Car Designed To Speed Tunnel Traffic

A gasoline-powered, single-wheeled car has made test runs on a 2,200-ft section of special guide rail on the catwalk of one tube of New York's Lincoln Tunnel. The car is expected to aid police in controlling and speeding traffic.

The 550-lb car is of aluminum and transparent plastic open-top design, 20 in. wide, 6 ft 10 in. long, and 4 ft 7 in. high.

Powered by an 8-hp engine, it can be operated in either direction at speeds up to 30 mph.



Manicouagan dam is 650-ft-high multiple arch.

Quebec Has Big Power Plans

The Province of Quebec is launching a hydro program that will add 4.5 million kw to its power output during the Sixties.

Hydroelectric Power Commission of Quebec (Hydro-Quebec) plans an early construction start on hydro development of the Manicouagan and Outardes rivers, which flow south into the St. Lawrence River downstream from Quebec. Some preliminary site work is already under way.

The Manicuoagan program comprises three power plants, including a 650-ft-high buttressed, multiple-arch dam, 4,000 ft long. A 1.1-million-kw powerhouse will be incorporated into the base of the dam's main arch and operate under a 505-ft head. An 800-sq-mile reservoir will hold 114 million acre-ft of water and rank with the largest man made lakes in the world.

Design work on this structure is well along and access roads to the site will be completed next month. Camp sites and a tunnel for study of geologic conditions have already been built, according to Hydro-Quebec.

The second power plant planned for the Manicouagan is a rockfill embankment with an underground plant located about 50 miles northwest of Baie Comeau, where the river joins the St. Lawrence. This powerhouse will be equipped with seven 85,000-kw generators using a 310-ft head.

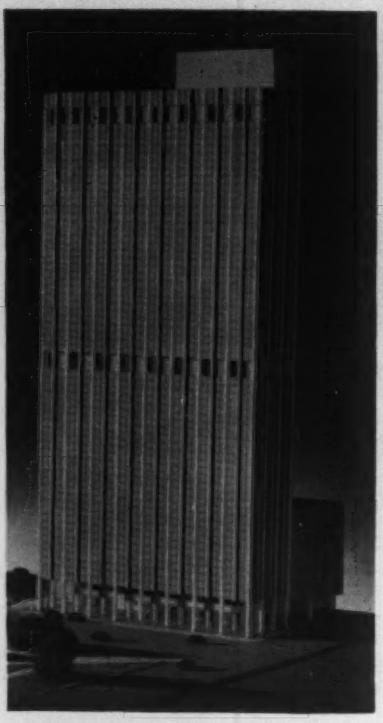
Just 10 miles from the Manicouagan's mouth the third plant, an 820,000-kw outdoor unit, will utilize a 240-ft head.

On the Outardes River two developments are planned. The upstream plant features a storage dam that will impound 14 million acre-ft and an underground power plant with a capacity of 522,000 kw. Thirteen miles downstream a sister plant will generate 550,000 kw and feature a long intake canal.

The major Manicouagan dam is located just below the outlet of Lake Manicouagan about 470 air miles from Montreal. Buttresses on either side of its main arch will be 450 ft apart; the other supports are 295 ft apart. The multiple arch structure will require 2,500,000 cu yd of concrete and take eight years to build.

The overall Manicouagan-Outardes development will provide river regulation that will increase the power potential of two existing hydro plants on the two rivers. The Manicouagan Power Company's plant on the river of the same name could boost its capacity from 82,000 kw to over 300,000 kw and the Quebec North Shore Paper Co. plant on Outardes also could be raised from its present 53,000 kw to a similar rating.

FIVE POWER PLANTS will boost Quebec's hydro output by 6 million kw.



35-Story Office Building Will Be LA's Tallest

A 35-story skyscraper estimated to cost more than $20 million will be the tallest building in Los Angeles.

Los Angeles changed its building code to permit high-rise buildings in 1958. Before then the height limit had been 13 stories. A major exception was the 26-story City Hall, built in 1927 and still the tallest structure in the city.

The new structural steel-framed building will be 485 ft tall. Distances between floors will be 13 ft. Total floor area is to be 615,000 sq ft.

The facade will feature marble-clad columns that extend the full height of the building. Floor divisions will be marked by opaque gray glass spandrels backed with a mesh of expanded aluminum. The tinted windows between the columns will be further divided by vertical aluminum air-conditioning ducts.

Perimeter air conditioning is planned for the building. An intermediate floor, possibly the 15th, and the top floor will house mechanical equipment for the air conditioning system.

The building will have 14 high-speed elevators.

A 500-car automatic electronic parking garage will be erected adjacent to the office structure.

David Shusett, a local real estate developer, is the owner. Charles Luckman Associates, Los Angeles, is the architect. Engineers have not been announced yet.

Robots to Test River Quality

An automatic water-quality monitoring system will go into operation this fall to aid in pollution control on the Ohio River.

Eventually robot monitors will keep an around-the-clock vigil at 40 points along the river and relay water-quality information to the Cincinnati headquarters of the eight-state Ohio River Valley Water Sanitation Commission (Orsanco).

The system will cost close to $250,000.

Major components of the system will be analyzers and transmitters at key points along the river; and in Cincinnati a receiver and data transcriber.

The analyzers are designed to test the water and to report automatically and continuously. At present component instruments for the analyzers have been perfected to monitor seven variables: dissolved oxygen, chloride, hydrogen-ion, specific conductance, oxidation-reduction potential, temperature, and solar radiation. The monitors have the capacity to handle three more variables. Surface tension is almost sure to be one of these. The commission has instruments for this purpose in manufacture in Germany now. Other possibilities under consideration for the remaining two vacancies include turbidity and radioactivity.

The telemeter receiver in Cincinnati is connected to the monitoring stations by telephone, and at regular intervals it calls the monitors for a report. The incoming signals from the monitors actuate the transcriber, which automatically types the information.

The new robot system will replace Orsanco's present network of 43 manually operated stations. The existing system began in 1951 with monitor stations manned by volunteers at municipal and industrial water plants. It was later expanded by contract with the U. S. Geological Survey for systematic monitoring of river quality and presently includes also surveillance by boat and plane. The main shortcoming of the old system is that it is not a constant, around-the-clock watch.

Each robot monitor (photo) comprises three 21x21x24-in. cubicles stacked in a weatherproof stainless steel cabinet. Flow cells and detectors are in the bottom cubicle, electronic measuring instruments in the center, and the telemeter transmitter in the top cubicle.

The transmitter is interchangeable with a multipoint, strip-chart recorder to permit operation of the unit as an independent monitor with on-site recording.

All the analyzing units in the center cubicle are identical in form, designed as plug-in modules. This makes quick substitution possible so that a module can be taken out for service without interrupting the monitoring.

REMOTE MONITOR tests 10 variables, telephones results to transcribing unit.

The flow-cell unit incorporates an automatic sample taker, which permits the storing of a quantity of river water when an abnormal condition warrants a much more detailed laboratory examination.

The circuits are designed for long-term stability, but adjustments will be made periodically (every 10 to 14 days at first) when electrodes and flow cells are cleaned.

The automatic system was conceived by Orsanco's executive director and chief engineer, Edward J. Cleary. It is officially called the Orsanco Robot Monitor. However, the agency retains no proprietary interest in possible future installations of a similar type elsewhere.

The equipment is a combination of standard shelf items and specially designed and manufactured components. Companies that engineered and fabricated the units are: Engineering Specialties Co., Madeira, Ohio; Minneapolis-Honeywell Corp., Philadelphia; and the Datex Corp., Monrovia, Calif.

The City of Cincinnati Water Works furnished facilities for testing equipment. Detailed execution of the project was the responsibility of Orsanco chemist-biologist William L. Klein, assisted by Carl Schneider, electronics consultant to Orsanco.

State Sets Up Schooling To Upgrade Engineer Aides

Unable to outbid private industry for engineering graduates, the Massachusetts Division of Personnel will send between 700 and 1,000 employees of the Department of Public Works to night school to qualify for associate B.S. degrees in engineering.

Aim of the program is to enable civil service personnel who have been doing various engineering jobs without degrees to move into positions as "senior" and "principal" engineers as they open up. Senior engineers go from $137.75 a week to $175 over six years; principal engineers from $153 to $195. Junior civil engineers start at $104.25 and step up to $131.

At present only one in every seven DPW employees can expect to become a principal engineer. And the department finds it "awkward" to put a young graduate in a post over men who, though lacking the formal schooling, have been performing engineering functions for many years.

By using the facilities of Lowell Technological Institute, a state school, supplemented by extension courses, the state expects to hold the cost of the educational program to $100 per year per student.

Diversion Tunnel Ready; Hanson Dam on the Way

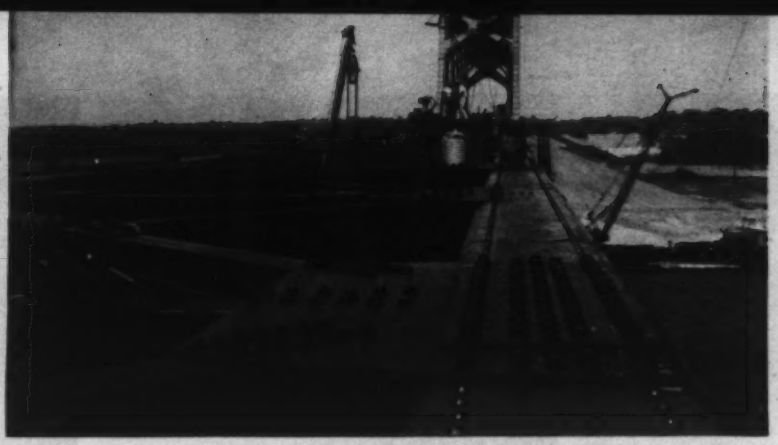
Grouting crews have completed a 900-ft-long, 19-ft-dia, concrete-lined diversion tunnel for Howard Hanson Dam, a Corps of Engineers flood-control project on Washington State's Green River.

This clears the way for actual river diversion, scheduled for next spring. Then major construction on the 235-ft-high rockfill dam itself can begin. Rock placement on the right abutment is now in progress.

Kaiser-Raymond International, joint venture holding the prime contract, is scheduled to complete the project in the fall of 1962. Workers are pushing around the clock six days a week now to complete the stilling basin before seasonal rains and high water, expected in mid-September, slow down construction.

Other work in progress includes construction of the outlet works control tower, excavation of the spillway approach channel, construction of a permanent administration building and clearing of the reservoir area, and road construction.

The main dam and outlet works are scheduled for completion in November, 1961, and partial flood-control storage will be available for the 1961-62 winter. Full flood protection will not be provided until after the spillway gates are installed in 1962.



Because of a shortage of skilled labor, bridge builders switch from . . .

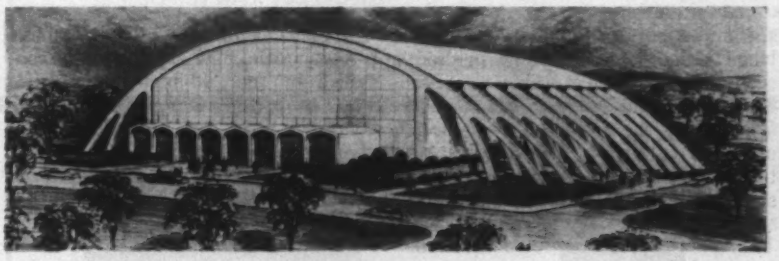
Rivets to Bolts in Midstream

Changing erection plans in midstream, Bethlehem Steel Co. will complete the partially built Chicago, Burlington & Quincy Railroad Bridge in Quincy, Ill., using high strength bolts instead of field rivets.

The 2,500-ft-long bridge will be the first major railroad crossing with high strength bolted connections. Howard, Needles, Tammen and Bergendoff, Kansas City consultants, approved the method, which has been used successfully on highway bridges for some years.

Reason for the change: Bethlehem had difficulty keeping the project on schedule because experienced riveters are in short supply in the Quincy area. Bolting can be done by workers with little experience.

The bridge has six steel plate girder spans and eight steel truss spans. The project also includes two shorter plate girder structures. Completion is scheduled for late this year.



Gym Bids Score on Second Try

New bids are in and Virginia Polytechnic Institute at Blacksburg will have its field house.

It will be framed with glue-laminated timber arches supported on reinforced concrete buttresses and it will cost $1.57 million—a price agreeable to Virginia Governor J. Lindsay Almond, who last May rejected all bids as too high when the low came in $350,000 above the architect's estimate. Low bidder then was Graham Bros., Richmond, Va., at $1.7 million.

This time T. C. Britton Co., Decatur, Ga., was the lowest of nine bids for general construction, at $1,349,155; low mechanical bid of ten submitted was by Daniels Plumbing & Heating, Norton, Va., at $162,593; and Muncie Electric Co., Narrows, Va., came in below seven other bids at $64,476 for the electrical work.

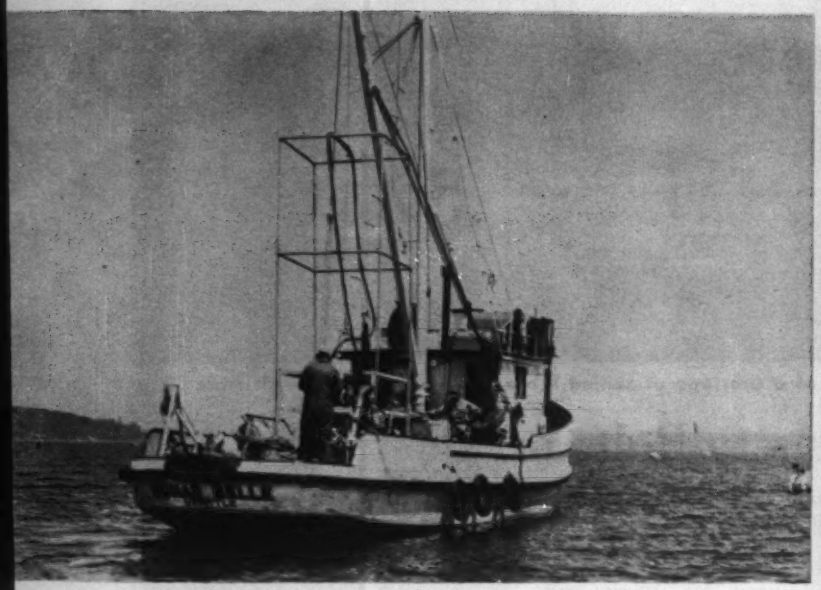
Construction will start this fall and should be completed within a year.

The building, designed by Carneal & Johnston, Richmond, Va., will enclose a 223x256-ft area with ten double concrete buttresses extending out 40 and 60 ft from each side of the structure. The double buttresses will rest on drilled-in caissons extending down to shale with 15-ton-per-sq-ft capacity. There will be no ties from the buttress foundations on one side of the building to those on the other.

There will be an entrance lobby two stories high and 50 ft deep at the front of the fieldhouse. Locker and dressing rooms, showers and offices will occupy an extension at the rear. Seating capacity will be 9,500 persons.

Glue-laminated timber arches span 223 ft across the interior of the building to provide a clear floor area.

There will be neither windows nor air conditioning.



Framework on boat deck houses TV camera . . .

which is lowered over the side for . . .

Inspection Work at 50 Fathoms

A television camera prowling at 300-ft depth in Washington's Hood Canal enables engineers to inspect the anchor system of the storm-damaged Hood Canal Floating Bridge without even getting their feet wet.

Seated in the galley of a converted fishing boat, the Sonar Belle, engineers of the Washington Toll Bridge Authority examine on two television screens the images of concrete bridge anchors too deep for divers to reach. They photograph the television screens for permanent records.

Severe storms damaged the uncompleted bridge last winter. Three of its 550-ton gravity anchors slipped down the steep slope that forms the bottom of the canal on one side, causing one connecting cable to break. Scouring action was suspected on others.

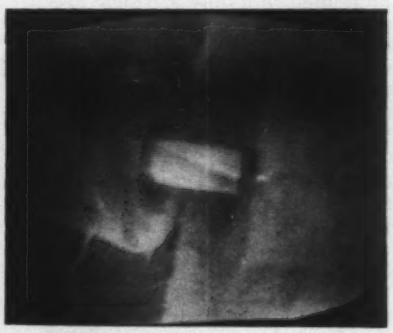
Divers were called in originally, but they couldn't work in the 180-ft to 340-ft depth at which many of the 42 anchors were sunk. In addition, the divers' reports were not always as complete as the engineers would have liked.

After hearing that the Navy was using television to recover torpedoes in nearby Dabob Bay, the authority engaged the Jacobson Brothers of Seattle and their 58-ft Sonar Belle to scout the bridge anchors for them.

The Sonar Belle resembles many other fishing boats in the area, except for the 5x5x16-ft framework of aluminum piping carried on her deck. The lower part of this framework carries a closed circuit television camera, eight 500-watt lights, and an electric compass, all sealed in watertight, stainless steel cases.

Movement of the 1,050-lb camera cage about the floor of the canal is controlled by four 40-lb anchors placed 1,000 ft apart at the four points of the compass. Steel lines from these anchors pass through pulleys at the top of the camera cage. Synchronized movement of these lines and the use of the boom and winch that raises and lowers the cage can position the television camera within a tolerance of a few inches.

The Hood Canal Floating Bridge will be composed of 23 reinforced concrete pontoons, each 50 ft wide, 14 ft deep and about 360 ft long. To resist lateral forces of wind, wave and tide, the pontoons are secured to concrete-filled gravity anchors resting on the canal bottom. These anchors are 19 ft wide, 40 ft long and 16 ft deep.



TV SCREEN in ship's galley shows length of cable extending from an anchor.

The crew of the Sonar Belle places the camera cage at one corner of an anchor and moves it around the four sides, a process that takes four or five hours. When the engineers want the position of concrete anchor, they get it from readings over a line from the electric compass.

The camera transmits a picture by coaxial cable to two monitors in the Sonar Belle galley. The anchors, already covered with marine growth, don't lend themselves to sharp pictures, but the results are good enough to satisfy the engineers.

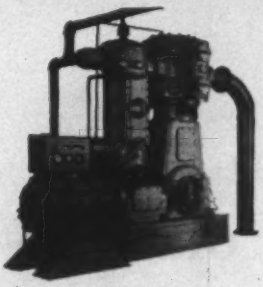
The camera unit not only examines the anchors, but measures the depth of the silt in which some of them are partially buried. A 14-ft steel probe ruler is built into the cage. A hydraulic motor lowers the probe until it reaches solid river bed. Contact with the bottom is signaled by a tilting of the camera.

Present plans call for inspection and photographing of half of the 42 anchors. The bridge had its first serious trouble late in 1958 when two pontoons sank (ENR Jan. 8, 1959, p. 25). Two pontoons were damaged in a collision a year later (ENR Dec. 24, 1959, p. 13) and six were damaged in a storm this year (ENR Feb. 18, p 30).

Howard, Needles, Tammen & Bergendoff, Kansas City, Mo., consulting engineers, have been retained to complete the design and construction of the bridge.

Which... ATLAS COPCO COMPRESSOR

meets your needs best?



AR Heavy-Duty Compressors

More air per horsepower than any comparable compressor! For continuous, full-load operation. "L" angle, 2-stage, double acting. Water cooled. Standard models provide 382 to 3210 cfm free-air delivery at 100 psi; only 76-590 hp required! (Can be supplied for other working pressures on request.)

What's your compressor requirement? Need an installation large enough to provide air for all your needs? Or would a small, compact unit for auxiliary operation solve your immediate problem? Either way—and for a wide range of applications between these extremes—Atlas Copco has the compressor for you!

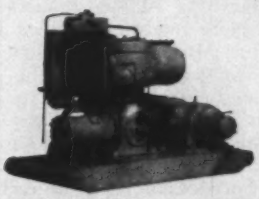
No matter which you choose, you'll get these proven advantages from Atlas Copco:

(1) More air per horsepower—less power consumption than other comparable units!

(2) Really low maintenance (one example—$3.10 after 10,000 hours' operation)!

(3) Specifications are guaranteed free-air delivery—you get exactly what you order!

Get all the facts now—and compare! The coupon below will bring you a free catalog. (No obligation, of course.)



AR-L Heavy-Duty Compressors

Same basic construction as the AR Series, but provided with an air-cooled intercooler and air-cooled radiator for the cylinder water. Fan on compressor flywheel cools radiators. Perfect for arid areas or where difficult to bring in water. Both stationary and skid-mounted models available.

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Brand new! "Twin-Air" Compressors offer capacities from 6,900 to 19,400 cfm at working pressures up to 115 psi. And, you get completely *oil-free* delivery of air or gas, since no lubrication is required — timing gears maintain small clearances between precision-mounted rotors, eliminating friction (and the necessity of oil) in compression chamber.

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Stationary, or skid-mounted compressors for use where air demand is between 50 and 300 cfm. Totally air-cooled. Cylinder arrangement designed for smooth, vibration-free operation. Compact, rugged—for continuous, 24-hour trouble-free service. Highly efficient; low on maintenance costs.

ER-6 Heavy-Duty Compressors

New! Fundamental improvements over conventional heavy-duty compressors reduce power requirements (18.3 hp/100 cfm at 100 psi, full load); provide totally enclosed design; and save on floor space. Capacities to 1,140 cfm; standard instruments and safety devices.

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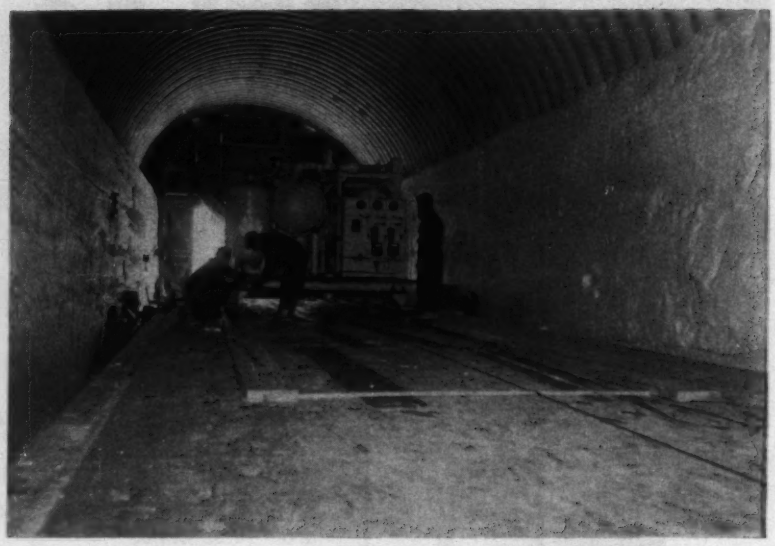
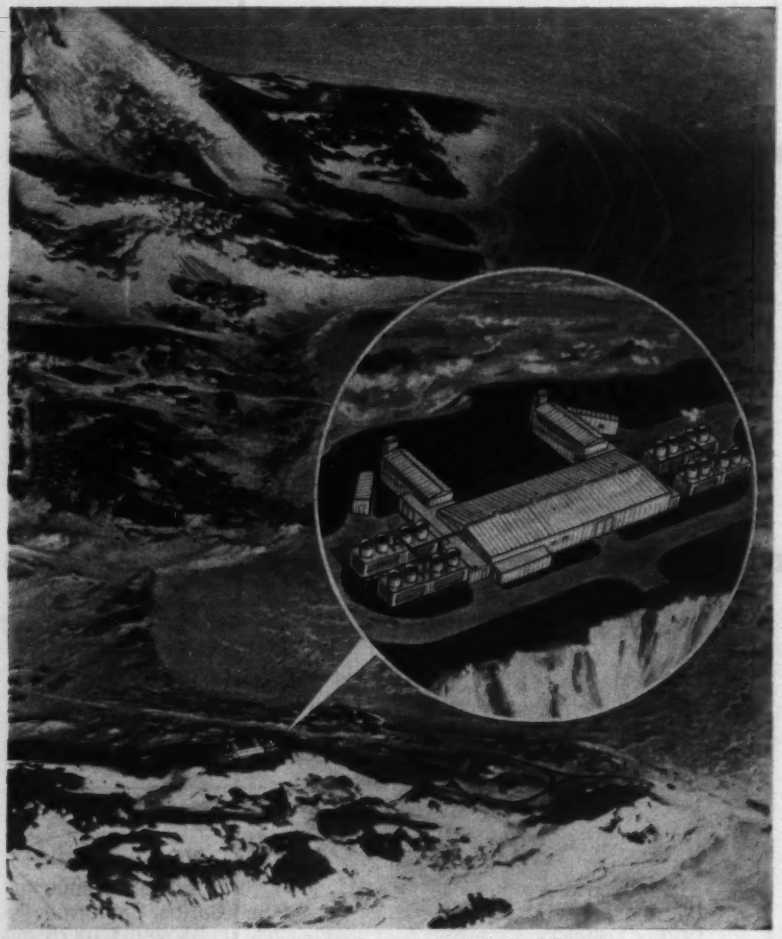


Frozen Arctic outpost gets . . . nuclear power plant that was shipped in 27 boxes.

Packaged A-Power Goes to Polar Posts



Antarctic nuclear plant will be air-transportable.

At Camp Century, the Corps of Engineers' under-snow camp 150 miles from Thule, Greenland, workers are putting the finishing touches on a 1,500-kw pressurized water reactor. It will supply heat, power and light for 100 scientists who will hibernate inside the icecap (ENR Sept. 3, 1959, p. 24).

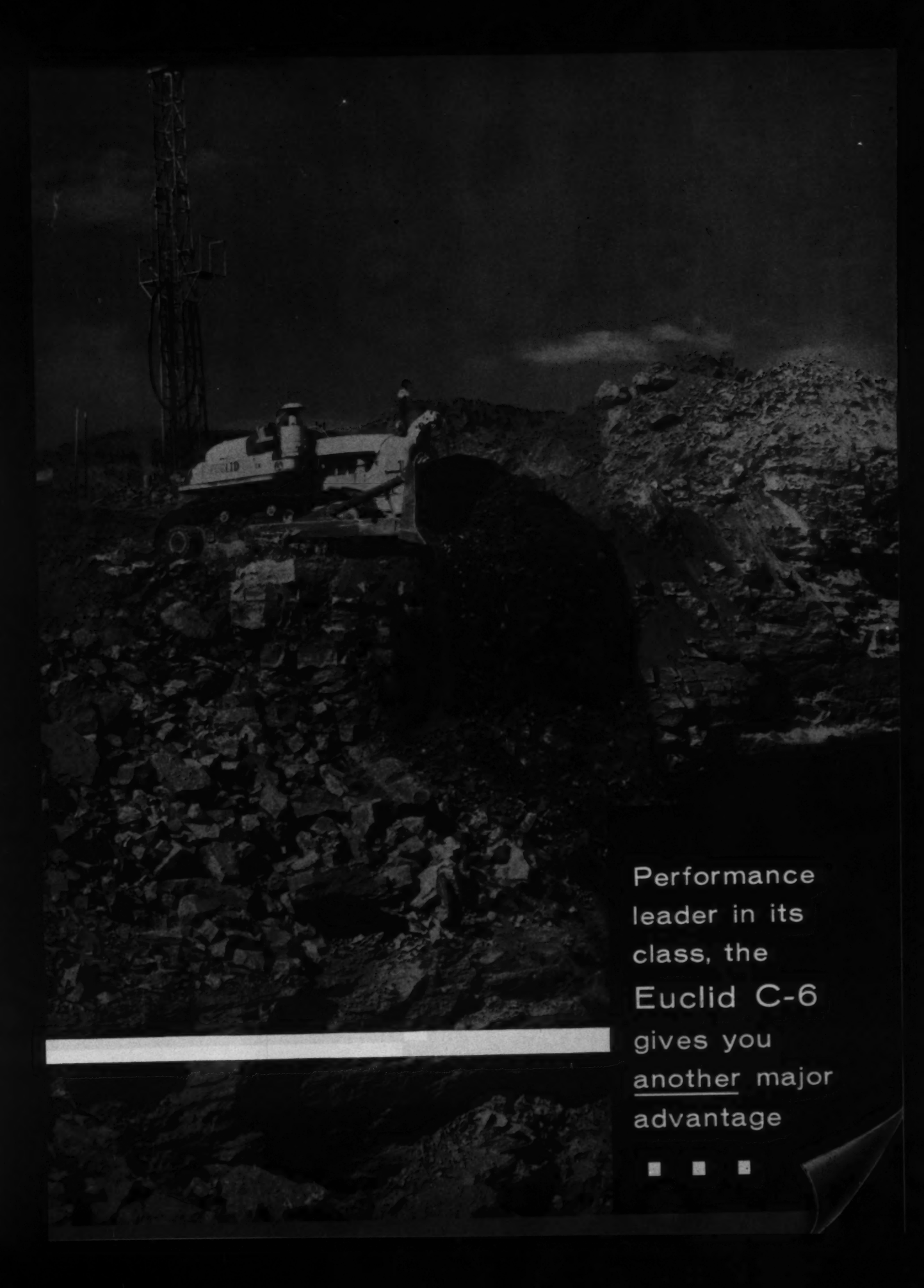
Known as PM-2A, this reactor was first built and pre-assembled by Alco Products, Inc., Schenectady, N .Y., then disassembled and shipped in 27 packages to the icecap outpost.

Its initial fuel core is good for 12 months—long enough to do away with 80% of the transportation effort otherwise needed to bring in fuel oil for diesel power generation.

Not to exclude the other end of the earth, Congress has approved a $3.5-million appropriation for a 1,500-kw, air-transportable nuclear reactor to be constructed at McMurdo Sound, Antarctica. Another $1.5 million already made available by the Navy will complete the financing of the packaged polar reactor.

In a slightly unusual procurement arrangement, the Atomic Energy Commission had already signed a construction contract with the Martin Co., Baltimore, in advance of the congressional appropriation. Under the contract Martin must be ready to ship the reactor—called PM-3A—by Nov. 1, 1961, and have it operating by March, 1962.

Besides the McMurdo plant, government bids are being prepared for two other reactors, which will be installed at Byrd Station and at the South Pole



Performance leader in its class, the Euclid C-6 gives you another major advantage

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Savings in engine costs alone make the "Euc" C-6 today's best tractor buy

In the Euclid C-6 you get the advantages of job proved power train components... the reliability of the GM 6-71 engine, Allison Torqmatic Drive and Euclid's famous planetary drive... that help keep downtime to a minimum. You get designed-in service accessibility that's unsurpassed by any competitive crawler... servicing or complete removal and replacement time is well below that required for comparable tractors.

You get a big advantage, too, in the lower cost of engine replacement parts... savings that cut your maintenance expense to the absolute minimum. For example, pistons and rings for two competitive engines are 79% and 163% higher in cost than for the GM engine; a water pump 255% and 257% more; up to 120% more in replacement of complete engine from fan to flywheel.

EUCLID Division of General Motors
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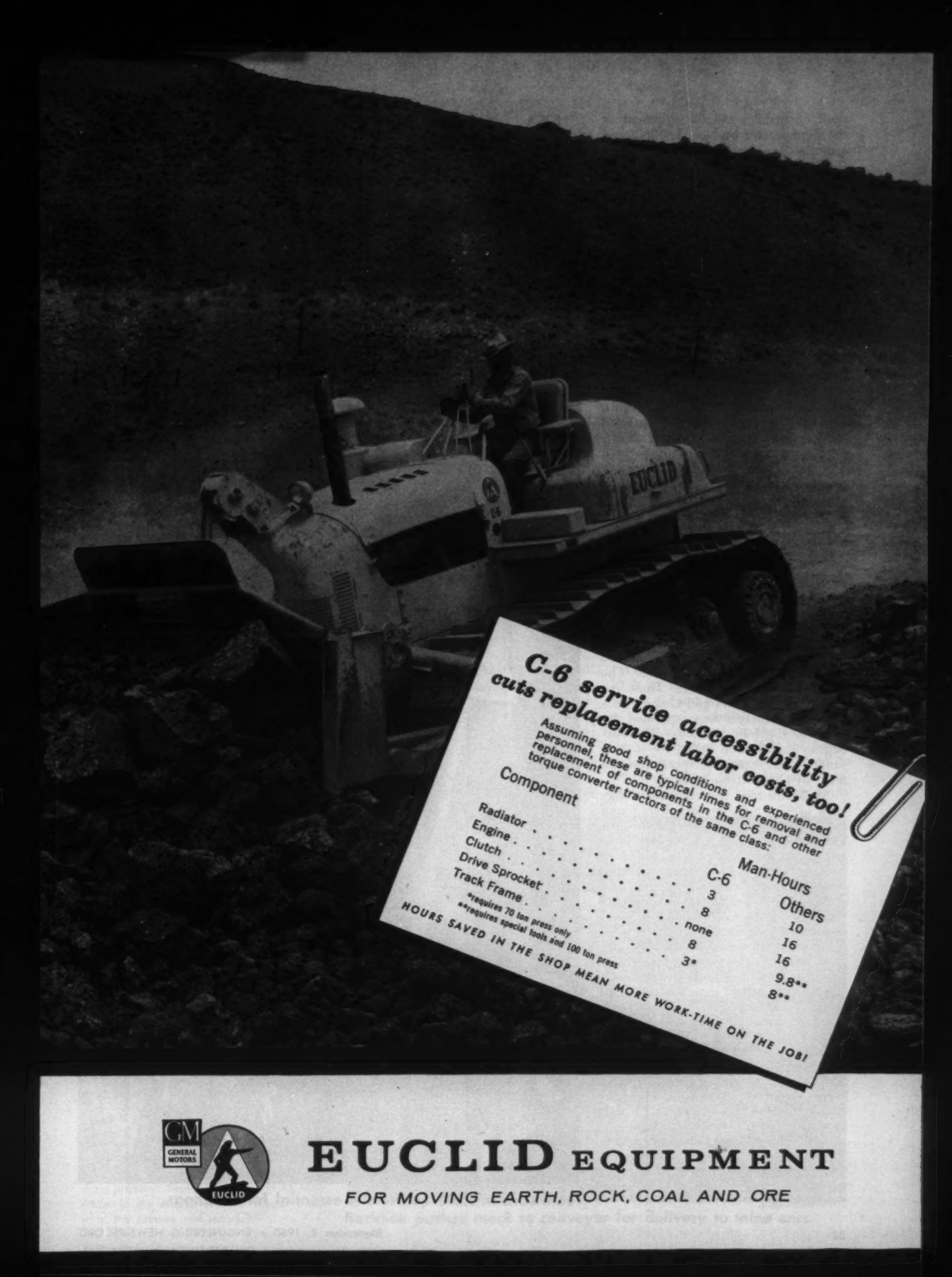
Full-power shift . . . fast-as-a-fox maneuverability . . . and greater over-all work-ability!

Have your dealer give you all the facts and figures on the C-6 . . . you'll find that in production and maintenance cost this "Euc" gives you a better return on investment.



C-6 service accessibility cuts replacement labor costs, too!

Assuming good shop conditions and experienced personnel, these are typical times for removal and replacement of components in the C-6 and other torque converter tractors of the same class:

Component	Man-Hours C-6	Others
Radiator	3	10
Engine	8	16
Clutch	none	16
Drive Sprocket	8	9.8**
Track Frame	3*	8**

*requires 70 ton press only
**requires special tools and 100 ton press

HOURS SAVED IN THE SHOP MEAN MORE WORK-TIME ON THE JOB!

GM GENERAL MOTORS EUCLID

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FOR MOVING EARTH, ROCK, COAL AND ORE

itself. Schedules call for shipment of the Byrd reactor by Nov. 1, 1962, and operation by March 1963; shipment of the Pole reactor by Nov. 1, 1963 and operation by March, 1964.

The Corps' Reactor Office, which operates under AEC supervision, estimates it will buy two or three reactors a year for the next few years.

Army reactor scientists say the military requirement for mobile nuclear power plants with reduced on-site construction effort and time should dovetail with civilian power needs in the less-developed areas of the world.

Army technicians visualize such mobile A-plants as power sources for remote bases, supply depots, hospitals and ports and as temporary emergency units. These facilities could later be converted to civilian uses.

Generally the portable plants will cost anywhere from two to three times as much as conventional power plants using diesel power. But for regions difficult and expensive to get to—the Arctic or Antarctic, for example—A-power may prove economical. The military already has about 15 nuclear power plants either built or somewhere along planning and production lines.

Early this year Kaiser Engineers, Oakland, Calif., submitted a cost analysis requested by AEC showing that four of ten remote military sites studied should have nuclear power plants. The four are: McMurdo Sound, Thule Air Force Base, Okinawa and Guam. Boiling-water reactors were specified for three of the four locations. The McMurdo specification called for a pressurized-water type—a factory pre-assembled, air transportable reactor.

At McMurdo, conventional energy costs of 97.5 mills per kwh were found to be more than double the nuclear energy costs of 47.7 mills per kwh. Acting on Kaiser's report, Congress in May authorized $13 million for the three Antarctic reactors.

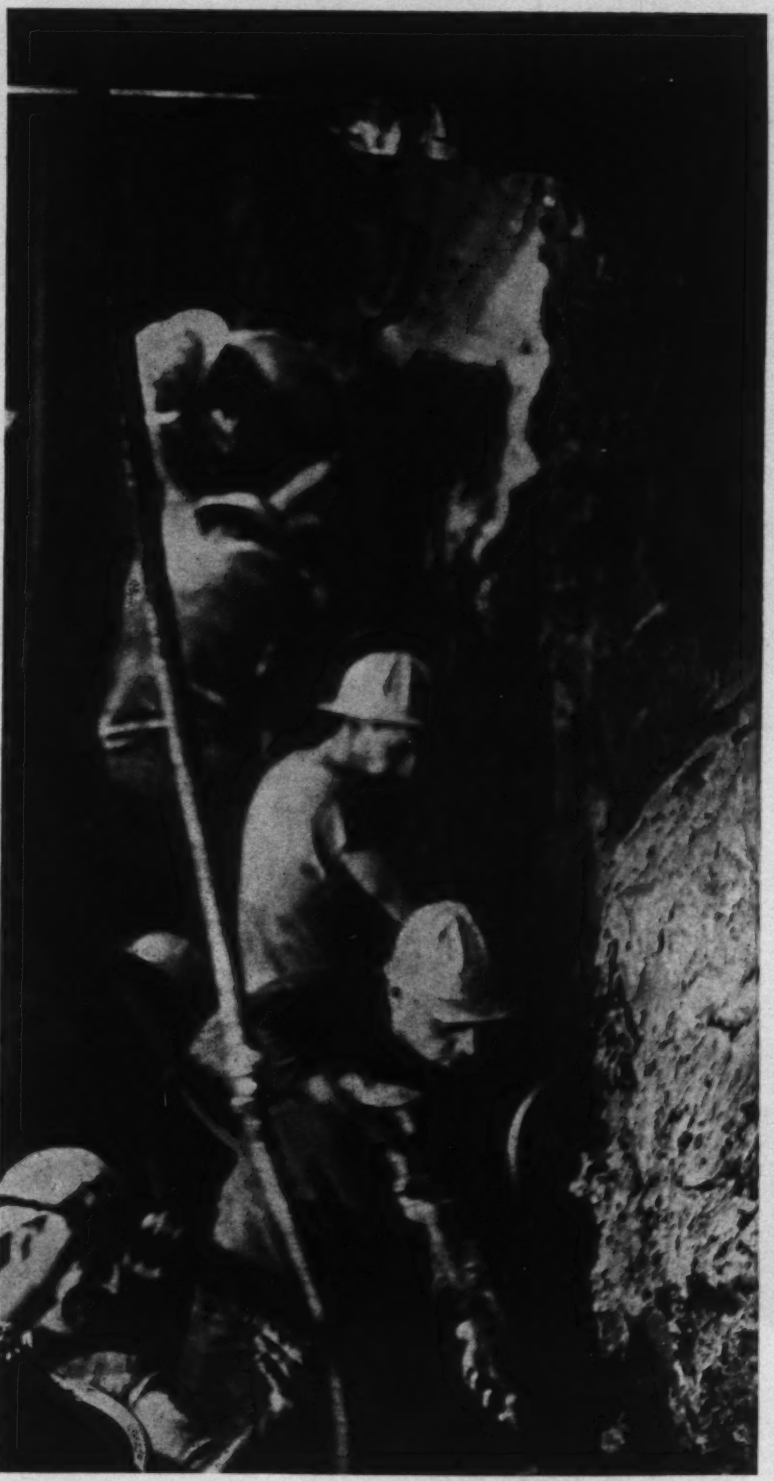
The Army Reactor Office plans to spend $16 million on its nuclear power program during fiscal 1961.

Corps technicians concentrate on these objectives for package plants:

- Improved plant mobility.
- Simplified and more rugged components and material.
- Improved reliability and safety and reduced initial costs.

At Fort Greely, Alaska, the Corps of Engineers has nearly completed the SM-1A, a stationary nuclear power plant patterned after Army Packaged Power Reactor No. 1, built at Ft. Belvoir, Va., in 1957 (ENR July 12, 1956, p. 45). The APPR-1 pilot reactor was the forerunner of the present breed of air-transportable, packaged reactor going in service in Greenland and slated for Antarctica.

Tunnelers Claw, Shove



Teamwork in close quarters is essential for sandhogs.

Through Clay Under Boston Harbor

By Edward M. Young, Jr.

A vehicular tunnel under construction beneath Boston Harbor is unusual in many ways. Among them:

- It is the only shield driven vehicular tunnel now under construction in the United States.
- It is the first underwater bore ever to be built here with steel liner plates acting as the structural members.
- It is currently being "shoved blind" through clay behind a bulkhead shield at the rate of 45 ft per day.

These distinctions belong to the Lt. William F. Callahan, Jr., Tunnel, being driven to relieve traffic in the overcrowded Sumner Tunnel between Boston and East Boston.

In recent years the trend in underwater tunneling has been away from shield driven compressed air work in favor of land based construction of tunnel sections floated into position and sunk into a previously excavated trench or to construction "in the dry" within tremie sealed cofferdams when water is not deep.

The structural use of steel liner plates, while common in rock tunnels, has not been attempted in underwater tunnels where external pressure and the corrosive action of water are important considerations. This structural job has been left to heavy cast iron plates, which have to be calked extensively.

In previous installations where steel liner plates have been used they have been little more than waterproofing membranes with no structural function. They have been backed with reinforced concrete, which supports the internal loads and resists external pressures. In the Callahan Tunnel the interior concrete lining will be unreinforced and will be little more than a filler.

Under normal conditions, an underwater bore through clay requires an open-faced shield. The material cannot be displaced, so it must be cut up, brought through the shield and transported to a portal or adit for disposal outside the bore. On the Callahan Tunnel this was the procedure for the first 2,000 ft (see pictures), and in that distance tunnelers seldom exceeded six rings in a 24-hour day.

In the middle of August the sand hogs found that the clay was getting softer. The contractor decided to bulkhead the face of the shield and drop the pressure within it to about 14 to 16 psi—about 10 less than that needed to equalize the hydrostatic head. This reduction in pressure allows water to percolate through the clay ahead of the work and helps keep it fluid enough to be displaced by the forward motion of the shield.

The operation is now similar to that which would be used in boring through silt, and the removal of spoil has been almost eliminated. As a result, the contractor is now placing as many as 17 rings a day, and he is confident that he can get even more if the soft clay condition holds. If it doesn't, he'll go back to the more conventional mucking methods, which he used initially.

Here's how he was mucking before—and will be again if the sandhogs hit hard clay:

Muckers, working at the face with pneumatic clay spades and winch-drawn clay knives, dropped chunks of clay to the bottom of the bore. A modified backhoe, mounted on a frame within the shield—and with a slightly curved plate replacing its bucket—then pushed the spoil back to a 40-ft-long, inclined conveyor. This conveyor carried the muck upward and back to a horizontal conveyor mounted on two jumbos. From this, the spoil was dropped into a loading hopper shaped like an inverted Y. Flap gates within the hopper permitted directing the spoil to either a left or right discharge chute for loading 6-cu-yd mine cars on either of two sets of tracks.

The cars were made up into three-car trains and were pulled by an eight-ton, battery-driven locomotive. The train was pulled under the conveyor so that the car closest the portal could be filled first. The locomotive then backed up so succeeding cars could be filled. With all three cars filled, the locomotive then pushed the train out through the 65-ft-long mud lock and into an open area outside the portal. A crane lifted the car bodies and dumped the muck in them onto a spoil heap. From the heap, the muck was loaded into trucks, either by bucket or front end loader, for disposal elsewhere.

However, with the bulkheaded shield, the spoil removal work is greatly reduced, the manpower requirements of the job are lessened and progress speeded. And there are secondary benefits that are very important.

The bore, in places, comes to within 10 ft of the channel bottom. A contractor did not want to risk a blow-out so he placed a blanket of clay totaling some 80,000 cu yd, on the harbor bottom over the eastern half of the tunnel area. This blanket was to be moved to the other side of the harbor as tunneling progressed. The new boring condi-

Backhoe pushes muck to conveyor for delivery to mine cars.

ENR Associate Editor Ed Young took this week's cover picture and most of the photos illustrating this article in available light (f 3.5, 1/50 sec, exposure index 1600). His main problem: Seeing what was in his view finder in the dim tunnel—he "couldn't see what the camera was seeing."

PACKING is forced into plate grooves.

LINER PLATES on car at mud lock are ready for delivery to heading.

GROUT PLANT is atop the jumbo. Conveyor (center) delivers materials.

tions may make the shift unnecessary.

And a further boon. When the boring was in hard clay, a void was left around the liner plates by the tail plate of the shield. Into this void the sandhogs had to blow pea gravel, which they then pressure grouted from a plant set up on the jumbo. In the soft clay there is no need for either the gravel or the grout, since the fluid material immediately encircles the steel shell.

The shell of the tube will be made up of 1,813 rings, each containing 12 plates for a total of 21,756 plates. These plates are responsible for much of the speed and economy of the lining work.

The steel plates were fabricated by Commercial Shearing and Stamping Co. of Youngstown, Ohio, to tolerances of $+\frac{1}{32}$-in. in width and $-\frac{1}{16}$-in. in length. They must be handled carefully because they are coated with a special coal tar enamel to protect them from the corrosive effect of salt water. If chipped, it must be repaired.

On one side and one end of each plate there is a machined groove into which workmen on the job fit $\frac{3}{4}$-in. square ungraphited asbestos packing.

The close tolerances and the packing eliminate need for the caulking, which is so time consuming when cast-iron plates are used. In addition, each plate is fitted with standard grease fittings through which is pumped an expoxy sealer to insure waterproofing.

ERECTOR ARM at back of shield places the tunnel plates.

WORKMEN BOLT plates together behind shield jacks.

From the surface, the plates are loaded onto small flat cars spotted outside the portal. Here, workmen jam the packing into the slots in the plates before they are hauled through the mud lock to the face heading. In the tunnel, the plates are lifted singly by a hydraulic boom on the jumbo and are fed to a hydraulic erecting arm at the back of the shield. As the arm puts each plate into place, workmen drift the holes into alignment and bolt each succeeding plate to its adjacent plates.

After each ring is completed, the 240-ton shield goes to work. It is moved by 28 hydraulic jacks, each capable of exerting a 200-ton push. These jacks work against each completed ring, moving the shield ahead 32 in. to make room for another ring of liner plates.

The alignment of liner plates has been good but one surprising condition has arisen since the work moved into soft clay. Ordinarily, there is a tendency for tunnel rings to flatten slightly at the top and bottom and to widen slightly at the sides because of pressure from above. This condition is counteracted by installing turnbuckles horizontally between the sides. In the soft clay under Boston Harbor, however, the flattening of the rings was in the other direction—the sides came in slightly and the top went up. This movement was attributed to the fluidity of the clay, which results in hydro-

GROUTING VOIDS outside the tunnel rings, men stand on liner plates.

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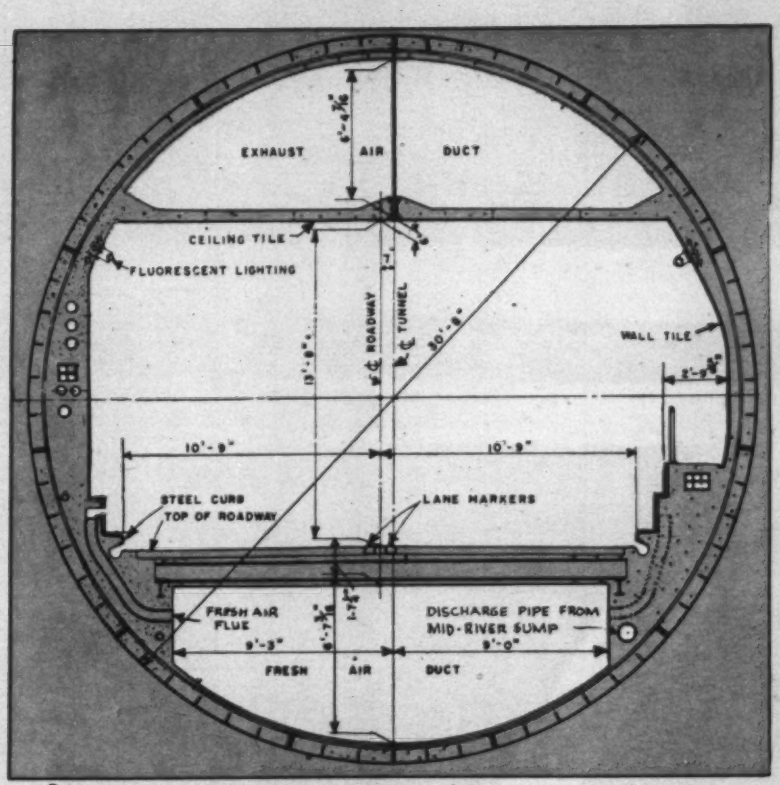


Cross-section of Callahan tube is conventional.

static pressures varying with depths. Pressure on the sides of the rings is greater than that on the top, so the elongation of the rings is vertical rather than horizontal. Initially, the contractor strutted the sides, but more recently elongation lessened enough to reduce the amount of strutting necessary.

The tunnel is being built for the Massachusetts Turnpike Authority by the Marine Division of the Perini Corp., of Framingham, Mass. It is adjacent and parallel to the Sumner Tunnel, opened to traffic in 1934.

Perini Corp. expects to complete work on the Callahan Tunnel by April, 1962. The contract includes not only the tunnel and its approaches but also erection and fitting out of the ventilation buildings on both sides of the harbor. In each building there will be six 300-cfm fans—three for blowing fresh air into the tube and three for exhausting impure air.

The Callahan tube, which has an outside diameter at the skin plate of 30 ft 8 in., will be 6,272 ft long from grade point to grade point and 5,070 ft from portal to portal. It will carry two 10-ft 9-in. lanes, will be lined with ceramic tile and illuminated with fluorescent lights. In its length, it will go beneath Boston Harbor, three wharfs and 12 city streets. Its approaches are in two of the most cluttered and traffic-ridden areas of Boston.

Perini also has a renovating job to do on Sumner Tunnel. This old tube is to be repaved, its ceiling sand-blasted, and new fluorescent lights are to be installed. In one of its ventilating buildings 14 new 14,000-cfm fans are to be installed—seven for blowing, seven for exhausting air.

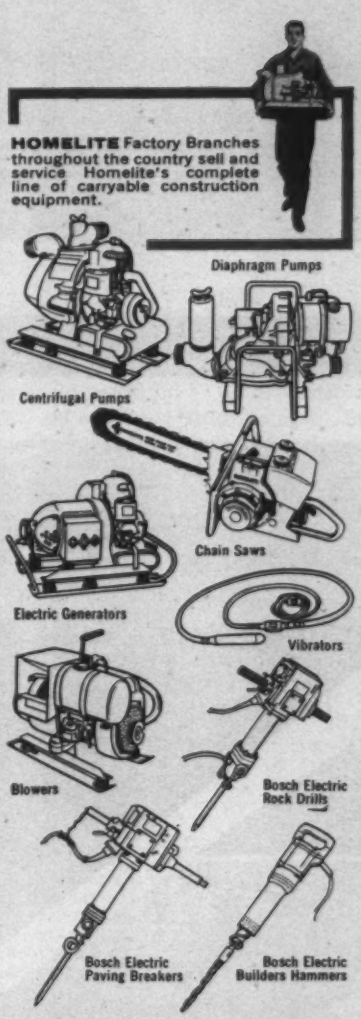
The Sumner Tunnel has long been a bottleneck. It carries more traffic every year than any other tunnel its size. The total exceeds 13 million vehicles annually.

Completion of Boston's central artery, which has exits at the tunnel on the Boston side, and the increasing importance of Logan Airport on the East Boston side, have made the second tube a must.

It is expected that when the new tube is completed in 1962 the traffic volume for the two tunnels will go to 17 million vehicles annually and that by 1966 a capacity volume of 23 million vehicles will be reached.

The Callahan Tunnel was designed by Singstad and Baillie of New York City. George Harp is the resident engineer for the consultant.

Irving R. Huie is project manager for Perini; Thomas Adair is tunnel superintendent; Marshall Dean is project engineer. Philip H. Kitfield is chief engineer and James F. Armstrong is resident engineer for the Massachusetts Turnpike Authority.



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All three jobs are parts of the Penn-Lincoln Parkway East in downtown Pittsburgh. A total of 4,250 tons of USS High-Strength Steel combined with 695 tons of A-7 steel, using both strength levels as good design dictated, were used to construct these modern over-passes and elevated structures. The designer and engineers were Richardson, Gordon & Associates, Pittsburgh, and the General Contractor, Fabricator and Erector was Fort Pitt Bridge Works, Pittsburgh, Pa. Concrete Contractor: John F. Casey Company, Pittsburgh, Pa.

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29% WEIGHT SAVING. This curved ramp off Grant Street has 7 spans of 65 feet and 1 span of 77 feet using 850 tons of USS MAN-TEN High-Strength Steel and 100 tons of A-7 steel. Simple rolled beams of high-strength steel were possible instead of built-up plate girders of A-7 steel. This is responsible for a large reduction in weight and cost. Again, due to deflection requirements, cross members were A-7 steel.

GREATER STRENGTH—MORE CLEARANCE. Westbound Parkway ramp near 10th Street, crossing B&O freight yards. A good application where MAN-TEN High-Strength Steel reduced the depth of the girders, providing greater clearance. This section has 12 spans: 9 simple span plate girders 130' x 66" deep and 3 anchor plate girder spans with cantilever arms 180' to 199' end to end x 66" deep. 3,100 tons of MAN-TEN Steel were used in the girders and 560 tons of A-7 steel were used for expansion dams, diaphragms and shear locks. Weight savings estimated —about 26%.

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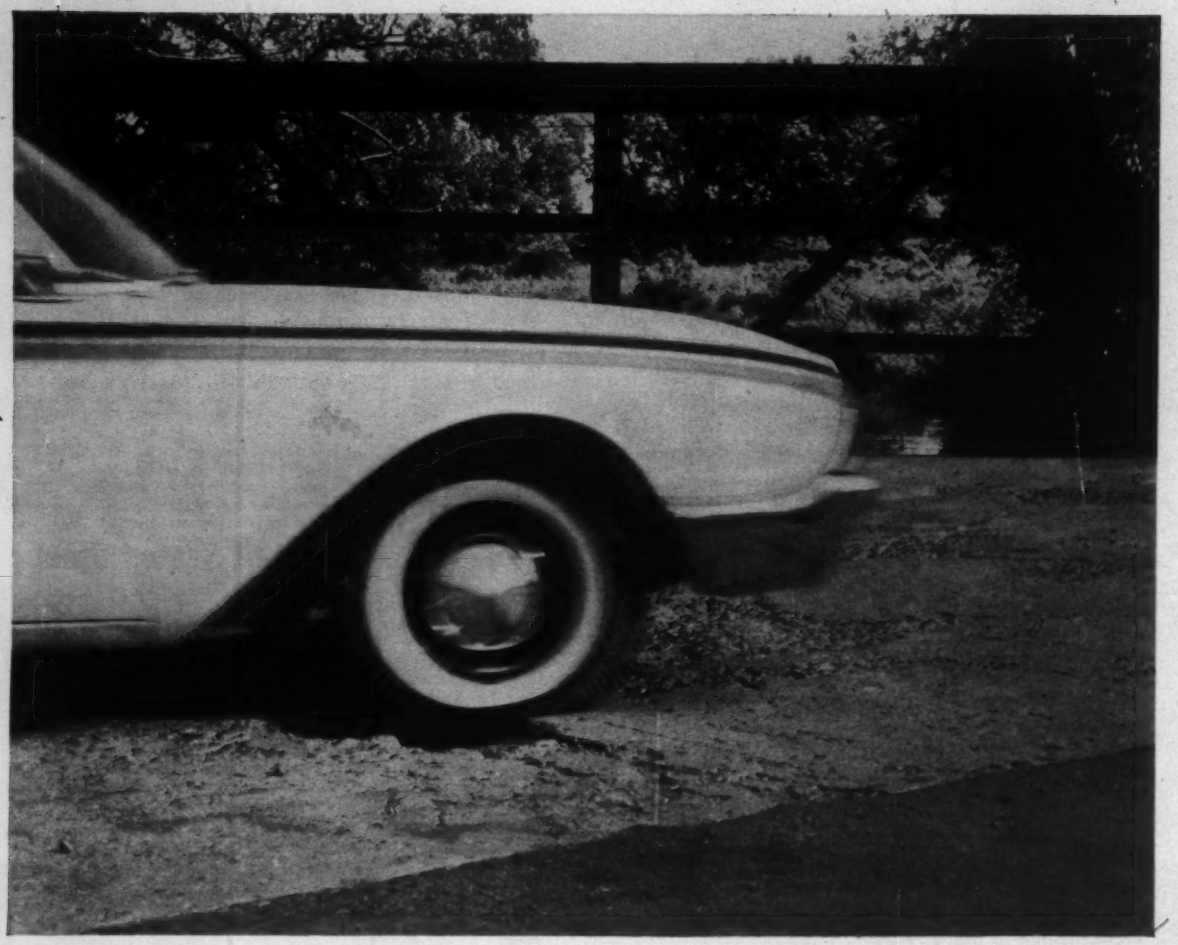

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Unusual roof framing is lightweight though involving spans up to 173 ft.

Steel Arches Cross Gym on Skew

By E. E. Hanks

Steel arches span in all directions to hold up the hollow-ribbed metal roof of a 13,800-sq-ft gymnasium. The roof is formed by four intersecting barrel arches. Its unique framing, including columns, weighs only 10.8 lb per sq ft.

The gym is part of a $300,000 physical education building for a high school in Dudley, N. C.

Heart of the roof framing is a pair of two-hinged steel arches that span diagonally over the 97x143-ft gym floor. These 173-ft arches—27WF94 sections—lie along the intersections of the barrrel arches and intersect at the crown. They are supported at the corners of the structure on four 10-in.-dia steel-pipe columns.

The pipe columns are braced with vertical king post trusses, with a horizontal strut at midheight to reduce the slenderness ratio. There are four trusses at each column.

Two 88-ft and two 60-ft tied arches, forming a quadrangle, span between the diagonal arches near their third points. The 88-ft arches are 16WF36 sections and the 60-ft arches 12WF27. With the diagonal arches and curved beams at side and end walls, these arches support steel purlins spaced about 6½ ft c-c. The curved beams rest on mullions spaced about 14 ft apart.

Steel arch roof is supported on columns outside the building.

The arch-thrust—240,000 lb—is taken by ties between the columns. The ties are grouted into the wall brickwork. Diagonal bracing was placed between the intermediate arches and the curved beams to resist lateral forces.

The brick corners of the gym are inset, leaving the steel columns outside the building and free of the walls. Most of the brickwork was done before the steel erector arrived on the site.

Steel erection was completed in only 12 working days. A single temporary column under the crown of the diagonal arches was the only falsework used. Two half sections of these arches and their tie were erected first, then an intermediate arch and purlins were set in place to brace them.

After that the remaining half sections, intermediate arches and purlins were positioned. Framing was completed with the erection of the mullions, curved beams, remaining purlins and bracing.

The temporary column remained until all connections were made. Field connections were bolted, high-strength bolts being used for the tie connections, unfinished bolts for all others.

Windows at sides and ends of the building are translucent, multicolored plastic panels.

Lowenstein-Atkinson were the architects-engineers. H. D. Barnes, Inc., was the general contractor. Structural steel was fabricated by Carolina Steel Corp. and erected by George E. Newton Co. All are located in Greensboro, N. C.

Ed Hanks, district engineer, American Institute of Steel Construction, Greensboro, N. C., has an alert eye for unusual structural framing in his territory. This is one of several articles he has contributed to ENR on novel structures.

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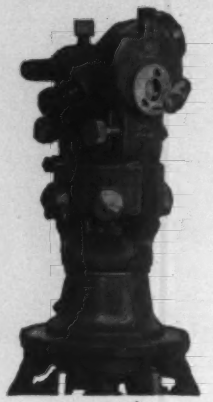

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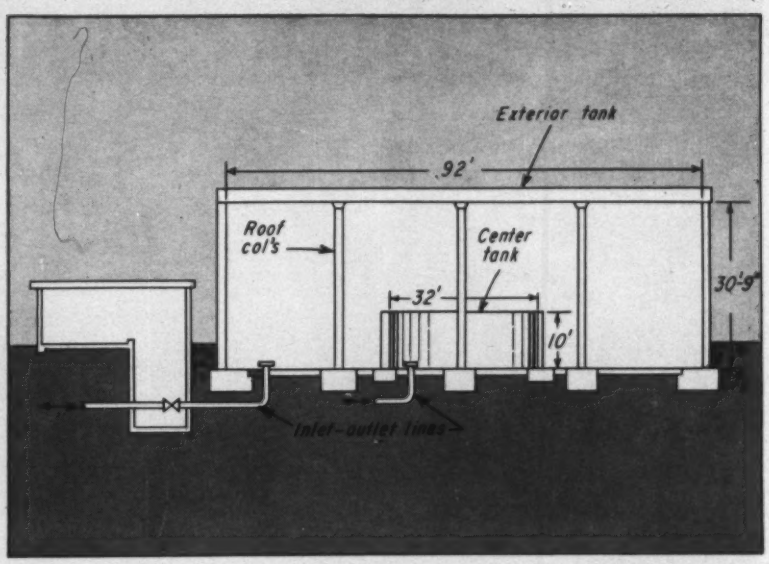

INTERIOR TANK permits cleaning large main water supply tank without interrupting service to the city.

Tank in a Tank Keeps Line Open

By W. E. Chapman

A water supply reservoir believed to be one of the few if not the only one in this country with an additional tank within its interior was recently completed by Daly City, Calif.

The exterior tank of 1,500,000 gal capacity is of prestressed concrete; conventional reinforced, rather than prestressed concrete is used for the 50,000 gal interior one.

The purpose of the arrangement is to allow cleaning the larger tank without taking the reservoir off the line at any time.

In studying ways to accomplish this objective, one possibility considered by the engineers was to provide a vertical wall across the diameter of the tank, dividing it into two equal sections. Investigation, however, revealed that severe bending stresses would occur in a prestressed tank filled on one side and empty on the other.

Also, the usual advantageous radial stresses or "hoop tensions" present in a normal prestressed tank would be lost by the use of this method. Furthermore, the dividing wall itself would be difficult to seal since the prestressed wall would move in and out in a radial direction as the tank was filled and emptied.

Another method, examined and dropped, was to build a two-story tank. Either tank could then be left in operation or cleaned as desired by the operator.

Obvious cost factors eliminated this alternative.

Still another way, and the one that is most commonly practiced, was to build two separate and equally sized tanks side-by-side.

However, this alternate increased the amount of land necessary for the tank site, and it further increased the cost, since one large tank would be cheaper than two tanks having the same combined capacities.

The final solution to this problem, as shown on the attached sketch, was to provide a smaller reinforced tank within the main tank. This arrangement had the advantage of concealment, avoided a separate roof and required no additional land on a site that was already crowded.

The interior tank was structurally designed to take loads from either side, so that either it or the main tank can be emptied for cleaning operations. A prestressed cylinder would not be suitable in this service, which was why reinforced concrete was used for the interior tank.

The total cost of the tank project was $99,700 of which the interior tank accounted for $3,500.

The writer developed the layout and the specifications in collaboration with Otis T. Calhoun, a former city engineer of Daly City.

The contractor was E. M. Penn Construction Co., Baldwin City, Calif.

Mr. Chapman, as city engineer of Daly City, supervised structural design and construction of this unusual tank installation. He also assisted in developing the layout and specifications.

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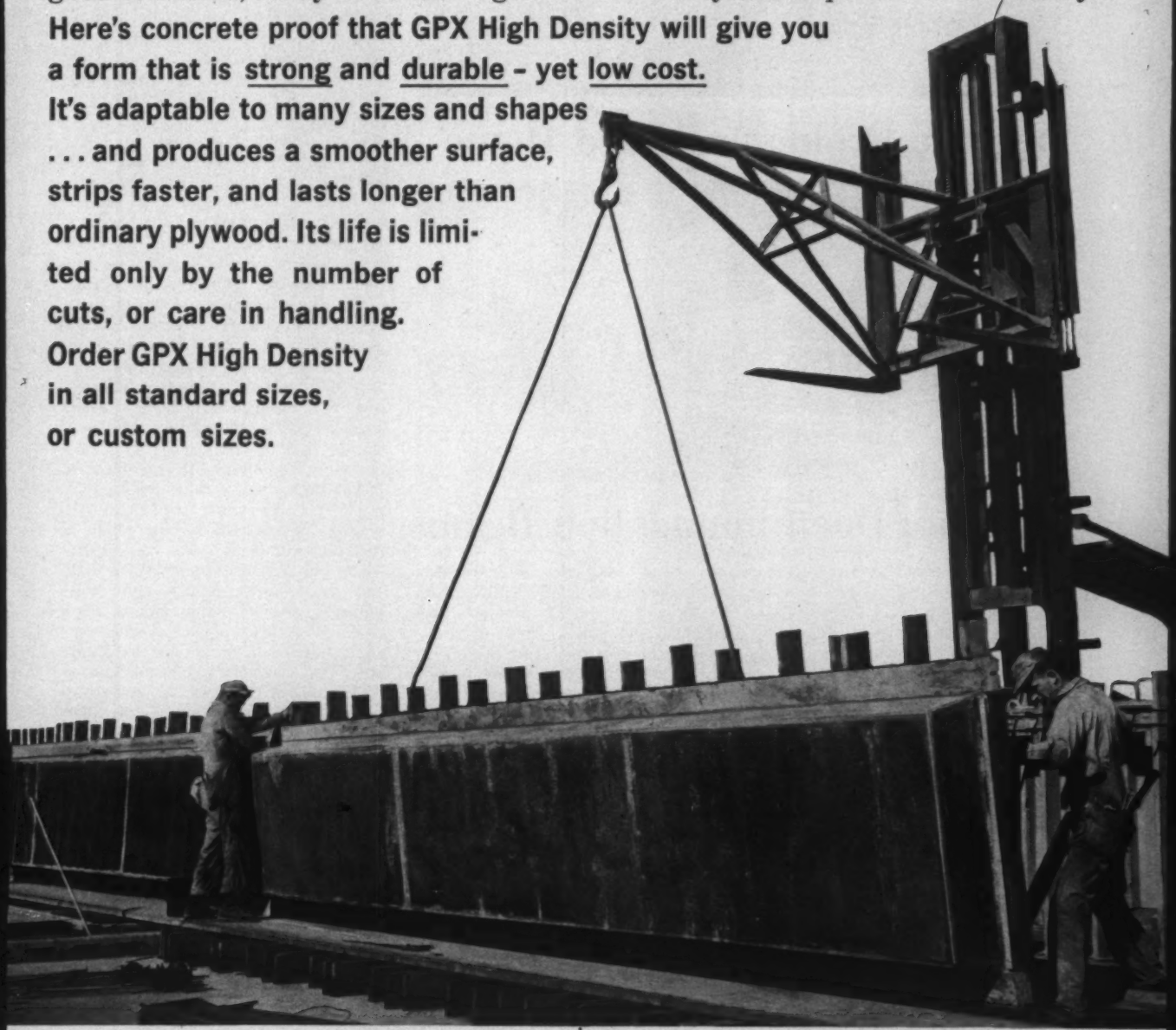

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Surprise Problem: Buried Dome

Solution: Deep Foundation Beams

For several hectic weeks, the contractor building a Brooklyn bowling alley wondered whether he was excavating for foundations or conducting an archaeological expedition.

Alexander Brown, president of Brownell Construction Corp. of New York City, expected his excavators to find a level concrete slab and a concrete wall, the remnants of a constant-pressure gas tank long since removed. Instead they unearthed a spherical dome, encircled by a massive brick wall 112 ft in diameter.

Steel plate sections, ¼-in. thick and riveted with lapped joints, covered the dome and the interior surface of the wall. The dome shell comprises an 11-in.-thick layer of brick over a 14-in. layer of concrete, which had been cast on compacted sand. Behind the steel lining the stepped brick wall reached a maximum thickness of 6 ft. Buttresses, spaced about 30 ft c-c around the perimeter, were 8 ft thick.

The wall-dome unit had obviously been designed to withstand the combined pressure from the water kept in the tank's bottom and the gas above. Reinforcing bars, 2 in. in diameter, reinforced the peripheral wall as a tension ring, resisting the dome's thrust. Apparently, the tank's designers had assumed only partial support of the dome from the underlying soil.

The architect's preliminary research through the records of the Brooklyn Union Gas Co. had turned up no trace of the weird substructure. There were no architectural or structural plans, only a location sketch. Available information indicated the construction date as sometime around the turn of the century.

Nor did the soil borings inform the bowling-alley designers of the dome's presence. Brick samples brought up by the sampler spoon were assumed to be rubble fill. One core boring penetrated the dome concrete at a point of shallow slope. The architect-engineer team correctly inferred that this was the tank foundation slab. But by itself, this boring did not reveal the curved surface of the slab.

At another point a test borer, trying to drill through the steel plate, succeeded only in ruining a diamond-core bit. The designers assumed this steel to be part of the old tank's superstructure, believed to have toppled into the excavation during its original dismantling.

The engineer originally designed the column foundations for the bowling alley with piers on spread footings located about 12 ft below the basement level. Soil borings outside the tank area indicated a two-ton soil at this elevation. After the contractor discovered the flatter portions of the dome about 7 ft above assumed elevation, the engineer immediately redesigned the column footings for a flat-rise dome.

A few days later, however, the contractor unearthed the steeply sloping portions of the dome. A second redesign for eight columns in this area was required. The columns could not be relocated; the steel had already been fabricated.

Deep concrete beams (up to 5 ft), spanning between the peripheral wall and stepped bearing seats notched into the brick surface of the dome, solved this foundation problem. The engineer designed the stepped seats on the dome for three tons per sq ft, relying on the concrete shell to distribute the bearing load to the underlying soil at a pressure of two tons per sq ft.

Removing the top of the peripheral walls to the proper elevation and cutting the seats in the dome's brick covering proved a difficult job. The brick crumbled away quite readily under the force of the jackhammers, but the old lime-mortar joints were tougher.

The same 2-cu-yd crane bucket that began the excavation work removed most of the brick rubble from the wall. A clamshell bucket was substituted where the distance between the wall and dome narrowed. For exploratory purposes, the excavation was carried down 40 ft below grade in one spot and continued another 7 ft by hand. It still failed to penetrate to the bottom of the dome.

The contractor removed the steel plate after flame-cutting it into manageable sections. Then, after cutting the wall down to proper elevation, he removed the old backfill and placed new porous granular material. This was compacted in layers and levelled at the bottom elevation of the foundation beams, which were then ready for forming and concreting.

Extra payments for the additional foundation work amounted to $30,600 on the $650,000 project. The added excavation and concrete for the deep foundation beams was partly offset by the reduced excavation and shorter piers.

Architect is Samuel S. Adlerstein & Associates; structural engineer, Martin Lovett. Both firms are from New York City. Diversified Industries, Inc., of New York City is the owner of the two-story split-level bowling alley.

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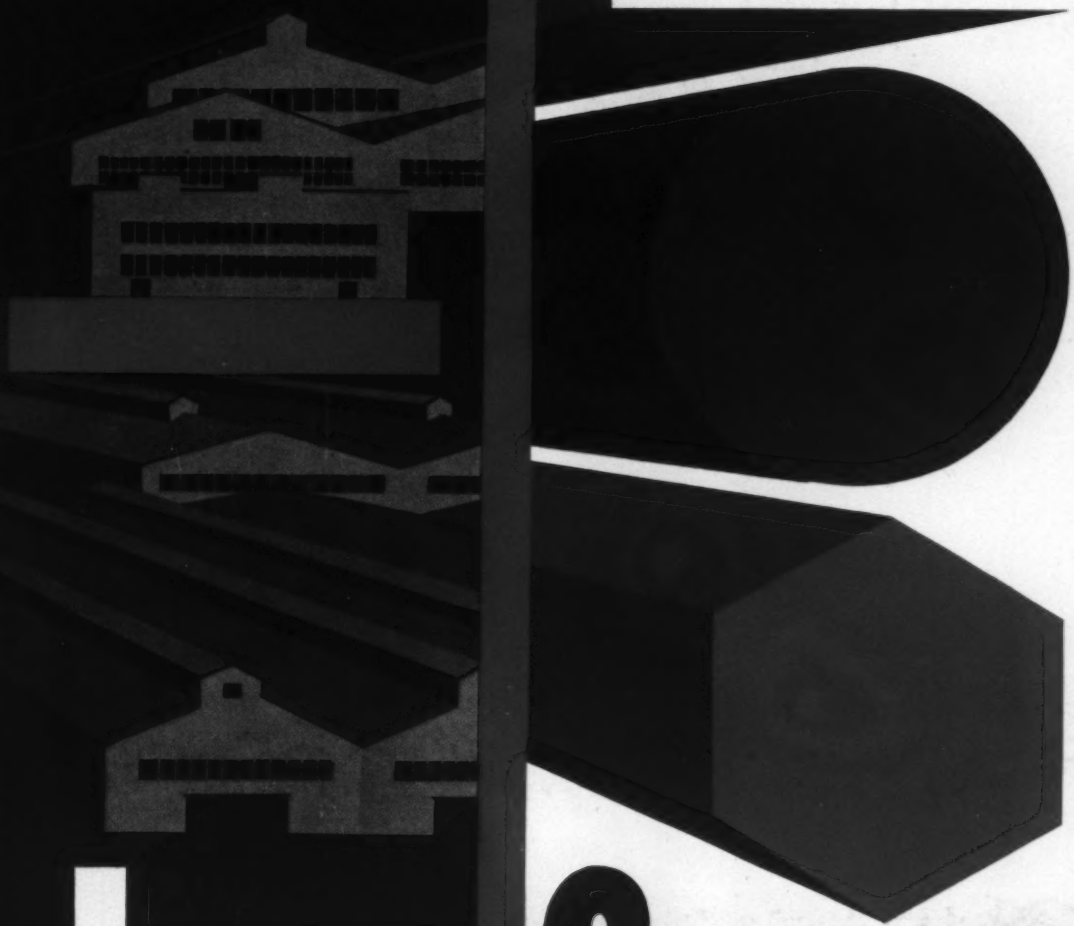

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Left to right: J. R. Riggs, General Superintendent, with Joe Metz, Gulf Sales Engineer, and E. E. Snyder, Project Manager. On-the-job engineering service is one of the plus values you get when you deal with Gulf.

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A vital part of this tremendous project is the 40-million dollar Tuscarora Pumping-Generating Plant. It's being constructed by the joint Tuscarora Contractors: Arundel Corp., L. E. Dixon Co., and the Hunkin-Conkey Co. Project Manager: E. E. Snyder. And behind him, 1,300 rugged crewmen and over two million dollars in construction equipment. Digging began on December 1, 1958. In one six-month period, this crew moved 1,300,000 cubic yards of rock—more than 1,000 cubic yards an hour.

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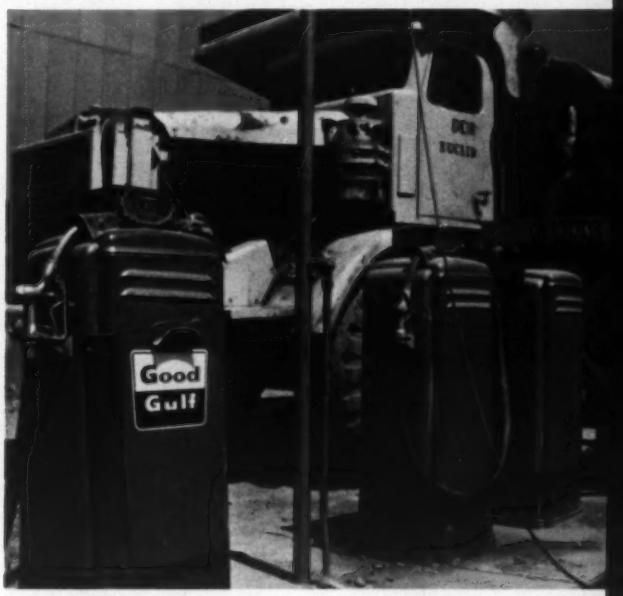

Fill 'er up. On this project, diesels have guzzled over a million gallons of Gulf diesel fuel. Other vehicles have used a quarter-million gallons of Good Gulf Gasoline.

rock moved, and not one transmission failure . . .

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Del Lundmark, Equipment Superintendent, says, "We're the only contractor on this project who hasn't lost at least one transmission—and we've moved 2 million cubic yards of rock. I feel that the hydraulic fluid we use—Gulf® Dieselube H.D.—deserves much of the credit." Lastly, Del says, "None of our equipment has failed from faulty lubrication. And we've used over a million gallons of Gulf® diesel fuel, and a quarter-million gallons each of Good Gulf® Gasoline, Gulf Super-Duty® motor oil and other Gulf® lubes."

On your next project, see how Gulf makes things run better! You can do the job faster and reduce maintenance costs with Gulf products and service. Call your nearest Gulf office.

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GULF

SP-9871

The photograph above shows a ceiling section of a factory in Pennsylvania after a flash fire. A new kind of paper lamination was used as a moisture-vapor barrier under the roof. This paper is *self-extinguishing* when its combustion temperature is reached. The intense heat burned away one of the layers in the lamination allowing this self-extinguishing feature to work . . . thereby helping to contain an otherwise potentially destructive fire.

This flame resisting material carries a minimum Underwriters' Laboratories Flame Spread rating. Called Pyro-Kure®, it is a combination of paper, foil and/or plastic. Permanently non-combustible it has a perm rating of less than 0.1 and is being used as insulation facing, pipe jacketing, duct lining.

If this product suggests a possible answer to a problem in your firm, we will be glad to hear from you. Write to our main offices in Attleboro, Massachusetts.

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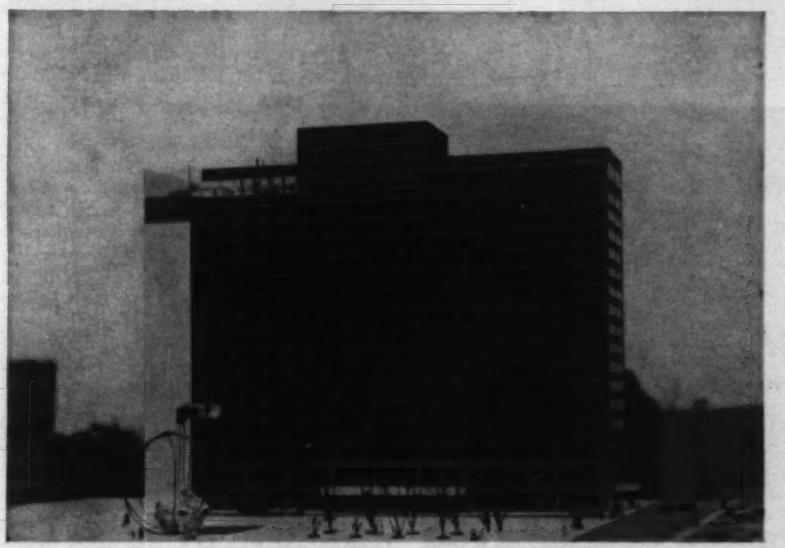
Mexico Hotel Rises in Cramped Quarters



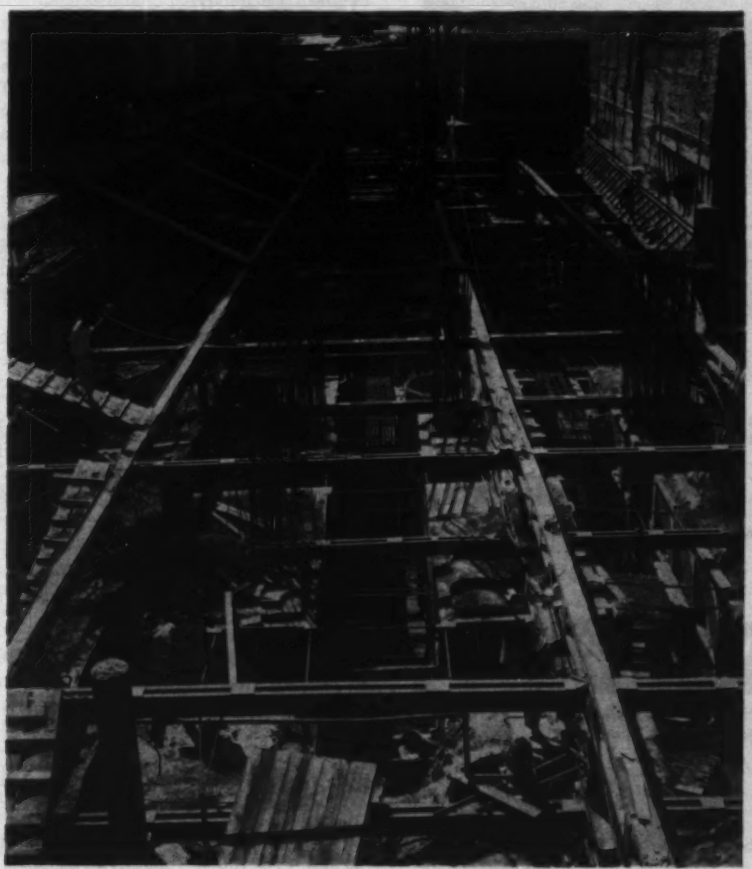
Building this hotel in crowded downtown Mexico City posed problems.

It's difficult enough to erect an 18-story hotel on a small plot between existing buildings. But when the existing buildings are standing on badly deteriorated foundations, the job really calls for delicate maneuvering.

That was the task facing Leonardo Zeevaert, consulting engineer for the $6-million Alameda hotel in Mexico City. The Alameda, which will be Mexico's biggest hotel, is going up on a 22,000-sq-ft site between two older hotels in a crowded downtown area of the growing capital.

The design called for the sinking of 617 piles. To prevent any disturbance of the adjacent weak foundations, engineer Zeevaert decided to drive the piles in an alternate pattern. All water levels had to be held constant during the driving—both inside the sheetpiling-encircled excavation and outside—otherwise contraction and subsequent earth movement would have occurred.

(Story continued on p. 50)



Tight quarters between existing hotels limited foundation work.

Dirt had to be removed by hand.

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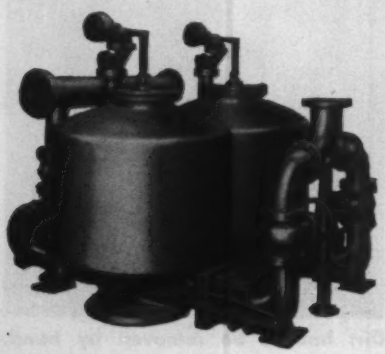

YEOMANS

1999-1 North Ruby Street
Melrose Park, Illinois

This is the SHONE® with mechanical controls. It is the *original* pneumatic ejector. The first SHONE® was installed in 1870.

. . . International

• The design calls for the hotel to rest on a continuous mat foundation over 617 piles. As an added safety factor, deep reinforced concrete walls will form a box for flotation.

• Workers had to carry out excavated dirt in 100-lb basket loads on their backs because no heavy equipment could get into confining latticework steel beam bracing squares, and adjacent hotels would not permit noise.

Here's how construction proceeded:

In early stages of planning, it was discovered that one of the adjacent hotels rested on a section of wooden piles that had failed. A corrective underpinning job was needed before Alameda work could get well under way. Underpinning is being done with sectionalized, precast concrete piles installed by hydraulic jacks.

Construction began on the Alameda foundations, however, while adjacent underpinning was still going on. So work had to be designed meticulously to "tread softly."

Since Mexico City's subsoil is one of an old lake bed, piles were driven 100 to 110 ft down to a compact layer of sand and gravel.

The contractor first drove wooden sheeting around the exterior of the site to a depth of 40 ft. He then placed a drain around the outside of the sheet wall. The drain both drew water out and pumped water into the site to maintain a constant water level.

Inside the walls, workers drove button bottom piles on 4-ft 8-in. centers over the site. To avoid heaving or soil movement, the piles were driven first in alternate rows along the adjacent hotel buildings, starting at the middle of the site and working to the rear.

The progress was repeated on the other half of the site. After that the entire lot was finished off in a figure eight pattern.

Some of the piles remained extended upwards to serve as supports for a steel beam network of braces, which was installed later. Other piles were driven so that their tops reached the minus-25-ft level to serve as the base for a 5-ft-thick basement slab.

All during piledriving a piezometer kept a careful check on water pressure at various elevations of subsoil.

Next the contractor excavated to 10 ft and installed steel beam bracing for the sheeting wall. Water in special drainage wells was pumped down 40 ft. Excavation continued to 15 ft and the second deck of bracing went in. All during this operation, water was being pumped outside the sheeting.

More bracing decks were installed 20 ft and 25 ft down.

The hand-labor excavators worked

Now part of Route Ohio No. 1 at Painesville in Lake County, Ohio, is this twin-cantilever truss bridge built by Mahon for the Ohio State Highway Dept. General contractor for this section of the road project was the National Engineering and Contracting Co. of Cleveland.

Structural steel
for new Ohio
twin-span bridge...

FABRICATED and ERECTED by MAHON

This twin-span bridge over the Grand River is an important link in the new Turnpike connecting-road-network now taking shape in Eastern Ohio. The bridge, and its steel-girder approaches, required more than 3100 tons of structural steel . . . fabricated and erected by Mahon.

Mahon's Structural Steel Division has the experience, capacity and facilities to handle your structural steel needs for buildings, bridges and other structures. It is a *single-source-responsibility* for the best in fabrication and erection —and assures on-time job completion at lowest possible cost. Invite Mahon to quote your projects . . . you'll be pleasantly surprised at how 'Mahon-packaged construction' can stretch your building budgets . . . compress your building time.

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one section at a time while walls held back soil in the yet unfinished cubicles.

When excavation is completed later this year (it will be completed while present construction of superstructure is under way), a 5-ft concrete slab will be poured across the pile heads. The piles that support the temporary bracing decks will be cut off after the bracing is removed.

Basement walls and permanent concrete cross-bracings are already in place. When strength is reached the temporary steel bracing will be removed, leaving a deep basement area.

Estructuras y Cimentaciones, S. A., is general contractor for the hotel. Gonbalo Garita, Jose Villagran G. and Ricardo Legorreta are the architects. All are from Mexico City.

Timber Conoids Roof a Station

Three timber conoid shells roof a newly built railroad station in Manchester, England, part of the British Railway's program of modernization.

Reason for the odd shapes: the new station had to be built on a triangular space over existing concrete arches and roadways. Construction could not interfere with railway traffic or operations in the station. The conoid shells were chosen because they could easily accommodate a triangular site. Timber was picked as the material because it minimized foundation loads.

The conoid shells also provided uninterrupted floor space and good natural lighting.

The three shells span from a maximum of 97 ft 3 in. to a minimum of 41 ft 6 in. and are 1¾ in. thick. They span from the top of the arch of each section to the tie of the following arch.

Each shell is composed of three layers of 2-in.-wide tongue-and-grooved board, nailed and glued, and laid in lines at 60 deg. to one another. The shells are supported on prefabricated glued laminated timber arches and ties. The conoids cantilever forward to preserve structural balance and to prevent glare.

Each shell is doubly curved. The laminated surface resolves bending stresses into axial stresses, easier for the timber to resist.

This type of design permits a roof of small thickness and large area without support, except at the edges, and with bracing only in the form of stiffening ribs parallel to the generating line.

During construction a temporary framework was set up and the boards were glued into place on top of it. When the shells were completed, the framework was removed, leaving the inside area of the station unobstructed.

The wood was left unfinished except for a coating of polyvinyl acetate and two coats of varnish on the outside surfaces. The inside was weatherproofed and finished with aluminum spray. Windows at the front of the arches are of translucent glass fiber.

Cost of constructing the shells, says a railway official was competitive with any conventional structure. The conoid roof alone cost about $64,000.

M. Clendinning of British Railways designed the station in consultation with the Timber Development Association, London. Hinker & Young, Ltd., Manchester, was general contractor.

For Helicopter Service Companies

IT'S A TRUCK

Sikorsky helicopters—hauling heavy equipment, parts, supplies and men right to the job—are working as trucks for: Okanagan Helicopters Inc., Petroleum Helicopters Inc., Rotor-Aids Inc., and Worldwide Helicopters Inc. Such companies lease Sikorsky helicopters to a wide range of industries to do a variety of trucking jobs. In a fraction of the time that it takes an on-the-road truck, and at less cost, helicopters deliver the goods.

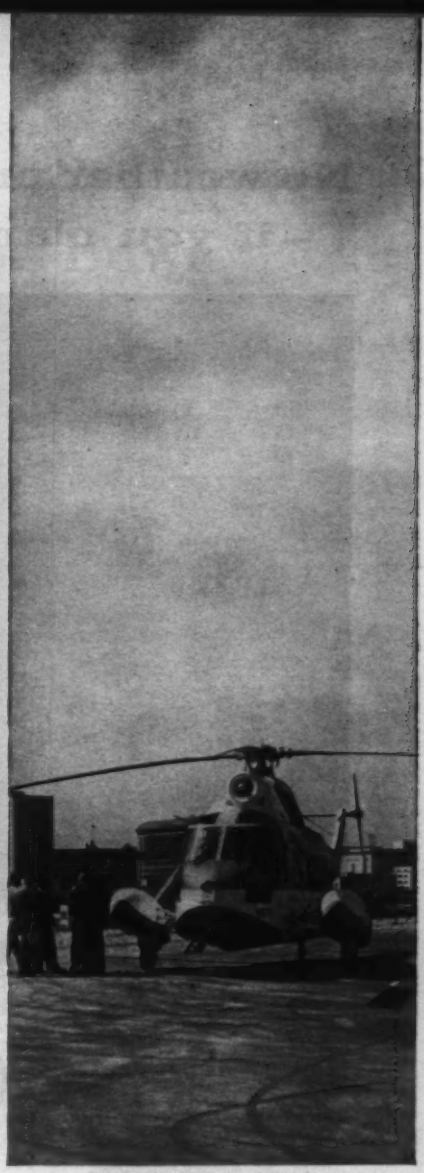
Working as trucks, Sikorsky helicopters are busily engaged in oil exploration, pipeline and transmission line construction, geodetic surveys and cargo transfers.

For the Puerto Rico Water Resources Authority

IT'S A CRANE

In Puerto Rico, work crews for the Water Authority once needed three to four *months* to plant 100 transmission-line poles. Now, one crew plants 100 poles in *one day* with just one Sikorsky helicopter. "Without the helicopter, it used to cost as much as $380 to set a pole. With the helicopter working as a crane, costs have tumbled to $35 to $75 a pole," reports Rafael R. Ramirez, the Authority's assistant executive director.

As cranes, Sikorsky helicopters are solving costly, time-consuming problems everywhere with a new approach—from the air. The result: lower costs, higher profits.



For the Indiana Gear Works

IT'S A COMPANY CAR

At the Indiana Gear Works, a Sikorsky S-51 helicopter (the newer S-62, shown above, is now available) speeds management personnel from company offices to outlying plants, from plant to plant, and out to the airport. "The saving in executive hours is almost incalculable," reports one official. This not only means time saved, money saved, but *more business accomplished.*

As company cars, Sikorsky helicopters are also ferrying high-salaried personnel city to city, city to airport and company office to customer's office. Helicopters are freeing executive hours for more productive work.

Sikorsky helicopters did all these things first. Altogether, they do more of these jobs today than all other vertical lift aircraft. To learn how your company can gain from the work of a Sikorsky helicopter truck, crane or company car, write to Sikorsky Aircraft today.

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PASS PIPE THROUGH PIPE UNDERGROUND

with Inner Circles

PRECAST REINFORCED CONCRETE TUNNEL PIPE

Worker guides an oval-shaped section of Inner Circles pipe which the Tunnelugger has carried through the conduit already laid.

Avoid the hampering effects of winter weather on outdoor construction by *working underground. Plan now* to utilize the Inner-Circles Method of building new sewers (left) and relining failing sewers (above) *this winter.*

Extensive surface excavation and back-fill eliminated • Reduced equipment and labor • Faster completion at *lower cost* • Overhead traffic undisturbed • Improved hydraulics • Pretested pipe strengths • Tight joints—even on sharp curves • Installation equipment furnished.

The two-way Tunnelugger can operate in either direction from a centrally operated shaft—quickly delivering and positioning elliptical sections through conduit already laid.

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Over and Under to the Gator Bowl

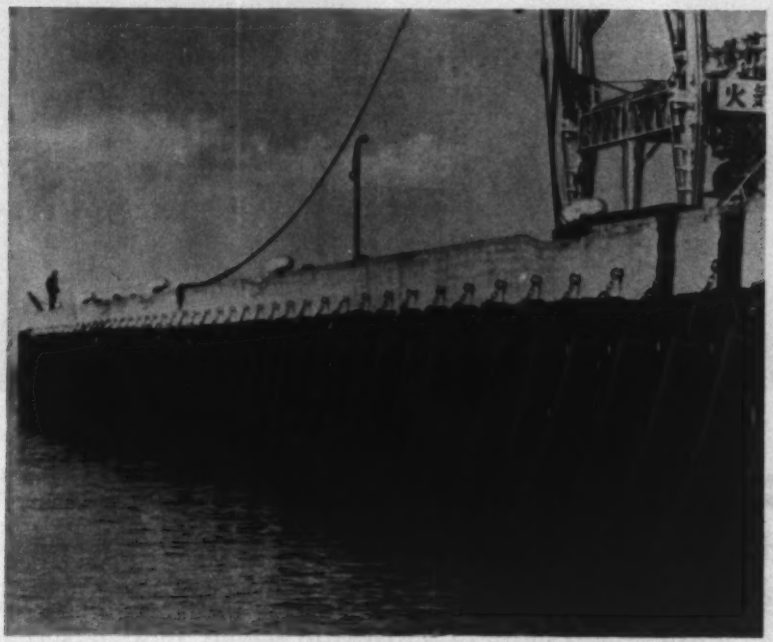
Sports fans moving to and from the Gator Bowl in Jacksonville, Fla., will be aided by an unusual interchange now under construction.

Traffic on this section of the Jacksonville Expressway system has already risen to an average 28,000 vehicles per day. Intense short duration traffic flows, which accompany sports events in the Gator Bowl complex, add to this and create a serious bottleneck. In addition to the 48,000-seat Gator Bowl for football, the complex includes an 11,000-capacity coliseum to be completed this fall and a 7,500-seat baseball park.

Because of heavy parking requirements for these spectator sports arenas and the presence of a potential industrial area, designers had to plan the interchange for a relatively limited area.

Reynolds, Smith and Hills, Jacksonville consulting engineers, designed the multi-level interchange. Four bridges will give quick access to and from the expressway. Two bridges will be two-lane, one three-lane and one one-lane. Three of the bridges are 150 ft long, and the other, 500 ft. Three incorporate prestressed concrete members and the other is a continuous reinforced concrete box girder.

Construction has been planned for a minimum of interruption to daily commuter traffic which must pass the job. Wiley N. Jackson, Roanoke, Va., won the contract with a low bid of $1,489,000.



Tubular Fenders Protect Dock

These tubular fenders have seen three years of service at a 500-ft-long dock belonging to a Japanese oil company. They are made of natural rubber and covered with neoprene.

The rubber provides the cushion needed to absorb impact energies in excess of 12,000 ft lb per fender, and the neoprene protects the rubber from abrasion and from the corrosive action of sea water and oil.

The fenders are about 14 in. in diameter and about 13 ft long and are supported by chains, which are threaded through them and attached to eyelets in the concrete dock.

Old Tires Help Burn Grubbed Out Trees

In clearing the mountain-top-site for Bethlehem Steel Co.'s new research laboratories in Bethlehem, Pa., the contractor on the excavation work, American Construction Co., Hartford, Conn., was faced with the problem of quickly disposing of huge quantities of freshly grubbed-out trees and brush.

The problem was solved by piling trees on top of a layer of old rubber tires, which were splashed with No. 2 fuel oil and ignited. Typical piles measured 50 ft across and were 25 ft high. The rubber kept the fire smouldering, while the blanket of trees confined and minimized the rubber smell and smoke. About 1,800 tires were used in disposing of the scrub brush and trees from 47 acres.

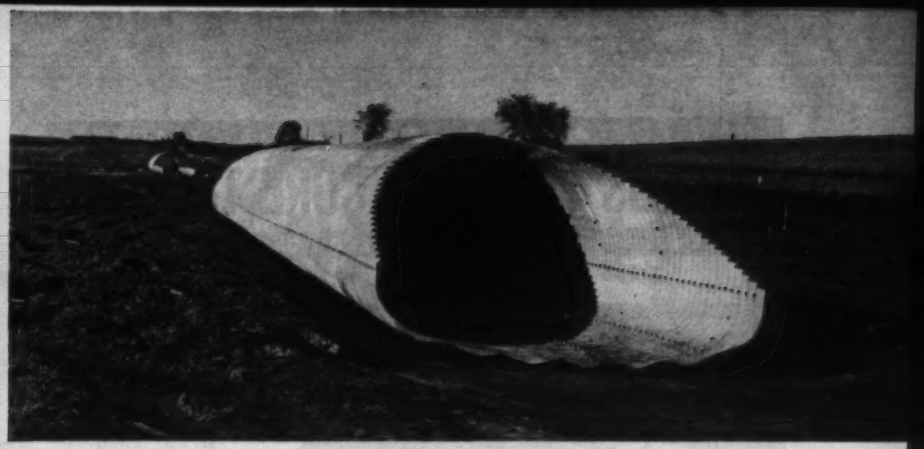
Since spraying fuel oil on the live fires would have been too hazardous a job for a workman, the contractor worked out a mechanical method. A 55-gal drum of fuel oil was fitted with a wire rope lifting sling in such a way that it would tilt toward the spigoted end.

It could then be picked up and swung out over the fire on the end of a crane boom.

General contractor on the research project is Turner Construction Co., New York. Voorhees, Walker, Smith, Smith & Haines is the architect.

How to avoid a collision course Head-on collisions on our highways have become a national tragedy. To save hapless drivers from steering a collision course on the New Jersey Turnpike, the Turnpike Authority has erected some USS AmBridge Highway Beam Guard Rails and Posts along this heavily traveled route. ☐ Sturdy steel barriers, two feet high, will be centered along the grass strips which divide the turnpike's traffic lanes. The barrier rails are made

This mark tells you a product is made of modern, dependable Steel.



USS AmBridge Sectional Plate is perfect for drainage structures or underground passageways. It won't crack, won't break. It's easy to install because there's no need for forms. AmBridge Sectional Plate comes in a complete range of sizes.

USS AmBridge I-Beam-Lok is a sturdy, lightweight bridge flooring. It installs quickly and easily with few interruptions. The filled type is available in units 6′ wide and up to 49′ long that apply directly to stringers on spans from 6′ up to 8′ centers. The open type is also available for spans up to 4′ centers.

of 10-gage steel plate bolted to spacers on 6″ WF, 8½-lb. steel posts 5′9″ long. These barriers are rugged. They'll put an effective stop to cars skidding across the grass into oncoming traffic. ☐ USS AmBridge Steel Beam Guard Rail is highly visible. It bolts easily but firmly to steel posts and is available in 12′6″ and 25′ lengths to minimize splicing. Write or contact any one of our offices for literature and information on American Bridge Highway Products.

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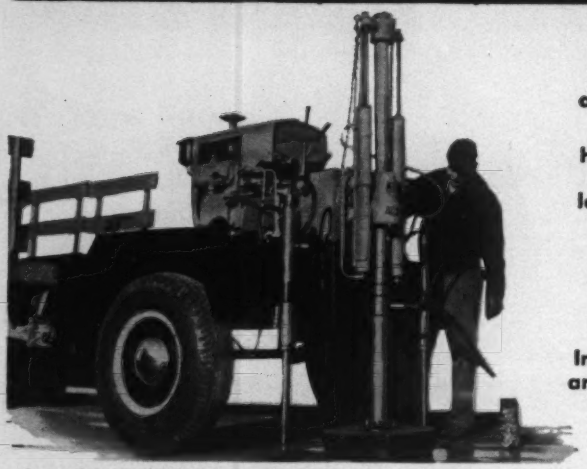
SPEEDS HIGHWAY CORE TESTING

65 CORES A DAY WITH HIGH SPEED ACKER DIAMOND BIT



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In routine operation, Acker's new highway test core drill using special Acker thin-wall diamond bits is producing 65 or more quality test cores per 8 hour shift.

Trailer mounted for portability, this new rig features a 100 gallon water tank and pump; a new built-in core barrel guide that saves time; hydraulic leveling jacks that simultaneously level the rig regardless of road contour; and dozens of valuable, exclusive features.

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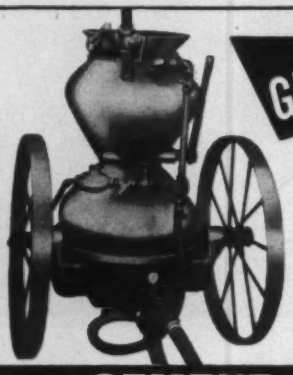

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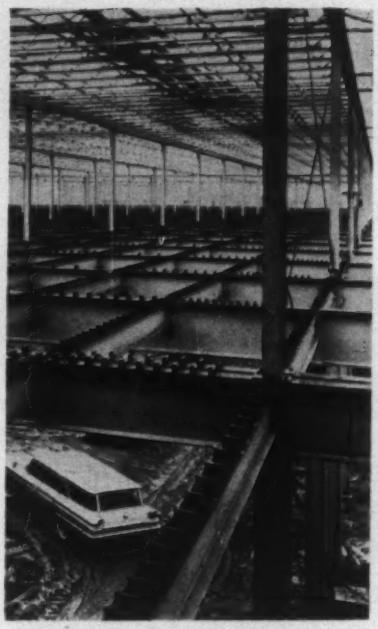

Composite Design Saves On Steel Frame Factory

Structural engineers, introducing composit design of buildings into the Midwest, found it the most economical framing system for a large factory in Grand Rapids, Mich. Comparisons with conventional structural steel framing indicated a tonnage saving of 20-25% in the composite beams and girders.

The building covers an area 280x1,145 ft, enclosing 640,000 sq ft of floor space within its two stories. One-way slabs, 6-in. thick, span 8 ft between the floor beams; the floor beams span 20 ft between girders; and the girders span the long dimension of the building's typical 20x40-ft bays.

The fabricator laid down more than 12 miles of fillet weld to connect the channel shear connectors to the top flanges of beams and girders.

The engineers framed the 40x40-ft roof bays with longspan joists, which support a 2½-in.-thick poured gypsum roof deck.

They aligned the roof girders in an alternating pattern of cantilevered and simple spans to cut down bending moments.

J & G Daveman Co. is the designer; Beckering Construction Co., the general contractor. Both are from Grand Rapids. Haven-Busch Co. of Grandville, Mich., fabricated and erected the 3,400 tons of structural steel used in the building.

Construction should be complete in time for fall occupancy by the owner, Steelcase, Inc.

On shoulder work...

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RIGHT: Ohio Turnpike, Eastern End, Western Division: applied over an existing macadam base, Bitumuls Single Surface Treatment gives a tight seal; excellent cover-retention for improved resistance to traffic.

Local specifications may vary from county to county, or state to state; but no matter how you designate shoulder work, the inherent economy of Bitumuls emulsified asphalt will result in important savings.

Applied cold – and compatible with all aggregates, damp or dry – Bitumuls saves time, reduces the equipment requirements for shoulder work.

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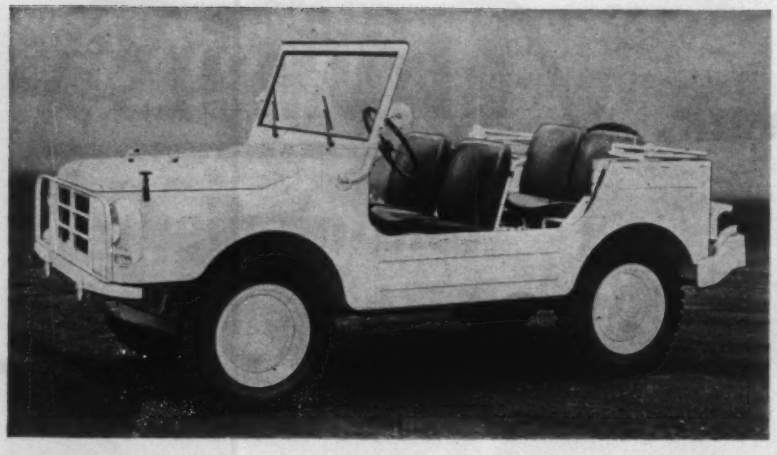


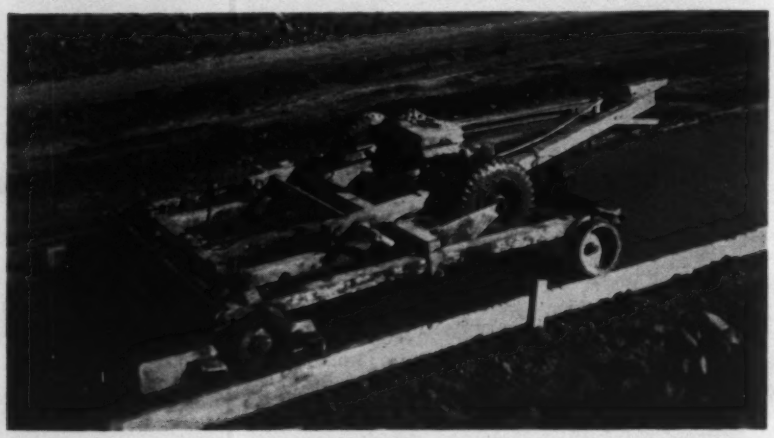
'Bronco' Tackles Rough Terrain

The Bronco, an all-purpose four-wheel drive vehicle is now being distributed in the United States by the Studebaker Packard Corporation.

Manufactured by West Germany's Auto Union DKW, the vehicle has eight forward speeds and two reverse speeds. It is credited with being able to carry itself and four passengers up a 50 deg. slope and of pulling an 1,100-lb trailer up a 30-deg grade.

Because of its high ground clearances, the Bronco is said to be ideally suited for rough terrain and it is capable of going through water up to 19½ in. deep.

Power is supplied by a three-cylinder DKW engine that developes 50 hp at 4,500 rpm. The vehicle has a wheel base of 78 in., overall length of 135 in., and operating weight of 2,387 lb. It is delivered with an all-weather canvas top and a heater. MERCEDES-BENZ SALES, INC., STUDEBAKER - PACKARD CORP., SOUTH BEND, IND.



Simple Sidewalk Rig Saves Time

The "Jiggle-Bug," a self-propelled sidewalk laydown machine, can screed, tamp and float concrete sidewalks while working from either steel or wood forms. The machine, which has a total weight of 300 lb, can be adjusted in 6-in. increments for sidewalks of from 4-to 6-ft widths.

The Jiggle-Bug can be worked with a two-man crew; one to handle concrete placement and the other to feed concrete to the screed bars. The screed bars move both laterally and vertically and are controlled by a variable speed regulator.

According to the manufacturer the Jiggle-Bug can process as much as 1,600 lin ft of sidewalk per hr. JAMES MANUFACTURING CO., 111 W. OSBORN RD., PHOENIX, ARIZONA.

Traffic Control System Features Adaptability

Semi-vehicle-actuated (SVA Series) and fully-vehicle-actuated (FVA Series) traffic controllers are designed to provide a flexible traffic control system. Each basic controller is designed and wired to accommodate a wide variety of accessory units. Additional accessories may be added at any time, to keep pace with changing traffic control needs.

A motor-driven cam unit offers maximum flexibility with minimum number of relays. All relays are jack-mounted. The cam unit has silver cadmium oxide contacts, rated at 10 amperes. Gold plated contacts are used on the timing circuits. These contacts require no adjustments.

The rigid can shaft has double shielded ball bearings with lifetime silicone lubricant. Cam unit, secondary panel, recall and signal shutdown switches, control dials for interval timing are mounted on the main hinged panel, which swings out for complete accessibility.

Electronic components are mounted on a hinged secondary panel that may be swung away from the face plate for servicing. Detachable wiring plug electrically connects the timer to the rear panel on which special features may be mounted. Color-coded wiring and stockinged wiring harnesses are used throughout the controller.

The controllers can be used with pressure-sensitive, magnetic, radar, or ultra-sonic detectors. CROUSE-HINDS CO., SYRACUSE 1, N. Y.

Self-Powered Drill Unit Attaches to Crane

A drill attachment that uses its own power unit for digging and is designed to be independent of the crane power source can be mounted on any standard ¾-ton crawler crane or one-cu-yard truck-mounted crane, its maker says.

The drill can be mounted or detached from the crane in an hour or less without special tools.

Hydraulic controls permit one-man operation.

Holes from 12 in. to 120 in. in dia can be drilled at speeds up to 45 ft per hour with this attachment.

Other features of the unit include a hydraulic positioner and boomstop combination. Telescoping models permit drilling to a depth of 150 ft without the need for additional drill stems. Holes as deep as 200 ft can be drilled. CALWELD, INC., 7222 E. SLAUSON AVE., LOS ANGELES 22, CALIF.

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Special Tracks, Will Travel

The crawler mounting for the ¾-cu-yd LS-78 shovel-crane is said to be quite different in design from the conventional shovel-crane mounting. It is designed for high traction and extensive traveling.

Key differences are the tractor-type track belt with full grouser shoes; an unusual compensating arrangement that automatically relieves excessive track tension caused by obstacles wedging between the track rail and idler wheel or drive sprocket; simple built-in track adjustment actuated by a grease gun; all track rollers, carrier rollers, idler wheels and track drive sprockets are mounted on sealed, tapered roller bearings, requiring no further lubrication; a completely sealed carbody that fully protects all components of the traction and power steer mechanism while traveling through deep water or muck; extra high (22 in.) ground clearance with clean, flat underbody.

Except for special adaptations, the upper machinery has the same basic design as all "78" series models. The adaptations include two-speed travel in either direction and, for proper lubrication on even the steepest grades, a higher oil level in the deck gear compartment, plus a deeper oil pan under the engine.

Hydraulic control lines located underneath the upper works are given added protection by a covering of heavy gage sheet metal. Operator seat is adjustable for operating on inclines. LINK-BELT SPEEDER CORP., 1201 SIXTH ST., SW, CEDAR RAPIDS, IOWA.

I-H Offers Seven Light Trucks

Seven service-utility bodies are designed specifically for International light-duty trucks 4,200 to 8,800 lb gross vehicle weight. They are offered in four conventional and three completely-enclosed models.

They have heavy-duty corrugated steel floors, full-length drip mouldings, completely-enclosed wheel housings and double panel, electrically welded steel compartment doors, according to the manufacturer.

All bodies offer 48½ in. of unobstructed space between compartment sides. Conventional models are available in 79, 82½, 89 and 100-in. lengths. Enclosed models, with locking double rear doors, are offered in 82½, 89 and 100-in. lengths. The 82½-in. bodies are designed for the International Travelette, which features a six-man cab.

Optional equipment available includes overhead rack with adjustable ladder and material brackets, telescopic steel roof with locking endgate, side-mounted pipe carrying brackets, heavy-duty rear bumper with safety-tread step and removable vise and pipe threader bracket. INTERNATIONAL HARVESTER CO., 180 NORTH MICHIGAN AVE., CHICAGO, ILL.

Some Ideas

for your file of practical information on surveying... from

KEUFFEL & ESSER CO.

"For want of a nail . . . the battle was lost." This might well be the epitaph for many a tardy survey. The right surveying accessories can do wonders to speed a field party's operation . . . and the lack of same can cause delays in a hundred minor ways a day. How goes the tempo of your work lately? . . .

Does your flagging really flag?

This K&E flagging does everything but tie its own knot. Made of tough, embossed vinyl plastic, it's practically impervious to time and tempest. Unlike the "quick-to-quit" red cloth commonly pressed into flagging service, this plastic flagging resists wind ravel like the stake itself, remains supple even at – 35° F., tears quick and clean, has exceptionally high tensile strength, and takes both pencil and ball-point pen like paper. Available in five high-visibility colors (red, yellow, blue, orange and white), K&E Plastic Flagging (No. 6525) measures 1¼" in width and comes in handy 4" diameter, 300' rolls. Great for gift wrapping and decorating, too!

You're only as good as your scales

A complete line of hard-to-get items has long been a K&E specialty. Of particular interest here is K&E's comprehensive line of Leveling Rod Replacement Scales. Available for all K&E metal-face rods, these replacement scales are marked in the conventional pattern and design in feet, 10ths and 100ths. In addition, they feature "ready-reading" foot numbers in red between the 3rd, 4th, 6th and 7th tenths to facilitate reading on short shots when the main foot marks are likely to be outside the field of view.

If your off-the-rod readings seem to be a bit fuzzy lately, don't throw out an expensive rod, simply replace the face with an inexpensive *new scale*. It takes but a few minutes with a screwdriver and small hammer to install one of these nominally-priced replacements. And how about carrying a spare for emergencies?

Should a leveling rod be level?

The unassisted naked eye – despite its widespread popularity – is *not* the tool to guarantee a vertical leveling rod. A handy K&E device called a Rod Level (No. N6299) is the proper Rx here. It's a simple bubble unit on a long-angle contact arm that affixes to the edge of the leveling rod in semi-permanent fashion. When the bubble is centered, the rod is vertical . . . and no mistake about it! This inexpensive but accurate device eliminates guesswork, makes for truly *precise* readings, and works easily – no juggling act required, just a fairly steady hand.

Now, for carrying this equipment...

. . . may we suggest the handsome Surveyor's Leather Bag (No. 6540)? Here's a sturdy carry-all expressly made to withstand the rigors of field work. Heavy-duty stitched throughout, it has an adjustable shoulder strap with movable pressure-pad, rust-resistant brass hardware, separate pad and paper slot, roomy interior pocket, and a rich riding-boot finish in natural tan. Measuring 10" high by 12" across by 2½" wide, it affords plenty of room for field book, plumb bob, tacks, targets, pencils, keel, measuring tape, numerous rolls of plastic flagging, replacement scales, and a rod level . . . to say nothing of your lunch, a few trout flies, etc.

All these and other K&E time-savers are available from your local K&E Dealer . . . or you can send us the coupon below for further information.

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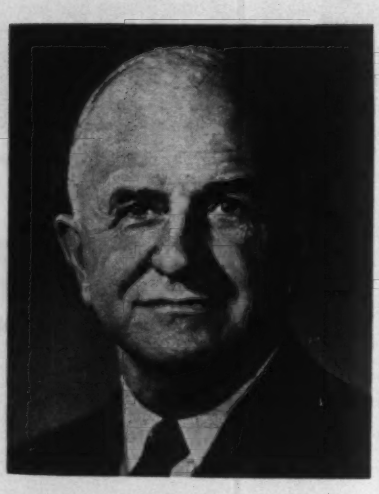
Men and Jobs



Stephen D. Bechtel Wins Coveted Engineers' Award

Stephen D. Bechtel, president of Bechtel Corp., San Francisco, has been selected as the 1961 recipient of the John Fritz Medal, an annual award for notable scientific or industrial achievement in the engineering profession.

The award, established in 1902 to perpetuate the memory of the late John Fritz' achievements in industrial progress, is one of the highest honors granted by the engineering profession. It is sponsored by the American Society of Civil Engineers, the American Society of Mechanical Engineers, the American Institute of Mining Engineers, the American Institute of Electrical Engineers and the American Institute of Chemical Engineers.

After serving with the Army Engineers in World War I, Mr. Bechtel went into the construction business with his father in 1919. He became vice president of the company in 1925 and eleven years later moved into the president's chair.

In 42 years, Mr. Bechtel has built the company which bears his name into one of the world's top-ranking engineering and construction organizations.

He has also served as chairman and member of the Business Advisory Council of the Department of Commerce; as trustee of the Committee for Economic Development; as one of President Eisenhower's five-man Advisory Committee on a National Highway Program; and as consultant to the National Security Council.

Among other awards, Mr. Bechtel has also received the 1952 Moles Award for outstanding achievement in construction. He will receive the Fritz medal at the annual meeting of the ASCE in Boston in October.

Briefs . . .

Retirements

Harold T. Reishus, vice president and executive head of the Construction Equipment Division of International Harvester Co., has retired on July 1. Associated with International Harvester since 1923, Mr. Reishus has been executive head of the Division since its formation in 1944. He is a past president of the Construction Industry Manufacturers Association. He will be succeeded by Robert B. Bradley, who has been president of International Harvester Company of Canada, Ltd.

Clarence L. Eckel, Dean of the University of Colorado College of Engineering since 1943, has retired.

Chester C. Burdick, director of the Minnesota highway department's Twin Cities area transportation study, is retiring after 40 years in the highway engineering profession.

Floyd E. le Van, authority on plant site selection and senior consulting engineer in Du Pont's engineering department, has retired after a 30-year career.

Associations

Don P. Reynolds has been appointed assistant secretary of the American Society of Civil Engineers to fill the vacancy created by the retirement of **E. Lawrence Chandler.** Mr. Reynolds has been on the ASCE staff for 14 years.

Bruce D. Bennett, manager of construction material sales for American Steel & Wire Division, U. S. Steel Corp., has been named president of the Wire Reinforcement Institute, a trade association of U. S. and Canadian welded wire fabric manufacturers.

Ralph L. Crow, Jr., vice president of the Wm. L. Crow Construction Co., has been re-elected president of the Metropolitan Builders Association—the New York City chapter of the Associated General Contractors of America, Inc.

The Pittsburgh chapter of the Pennsylvania Society of Professional Engineers has installed as president **Russell M. Jenkins,** chief engineer of the Bess Construction Co.

Edward J. Wolf, Chicago consulting engineer, has been elected to represent the Consulting Engineers Council on the executive board of Federation Internationale des Ingenieurs-Conseils.

The National Sand and Gravel Association and the National Ready Mixed Concrete Association announce the appointment of **John R. Wilson** as associate engineer on their joint engineering staff.

Business

Melbourne A. Forrest has been named a vice president by Burns & Roe, Inc., New York City engineers and constructors. He will be responsible for the company's defense and aeronautical projects and its operations in power and nuclear as well as industrial facilities.

Arthur D. Benjamin and **Peter Flack** have formed a partnership in New York City to be named Benjamin & Flack, Consulting Engineers.

Charles A. Peterson has been moved up to project manager on Howard A. Hanson Dam in Washington. Henry J. Kaiser Co. and Raymond International, Inc., are partners on the project.

John T. Reinhard is president of Hydro Mat Linings, Inc., a new Ann Arbor, Mich., company incorporated to do engineering and construction. The organization specializes in the installation of flexible linings for reservoirs, ponds, and other containments.

At Stone & Webster, Boston, **Theodore E. Casselman, Jr., Wilbur S. Roberts, Jr.** and **J. Marshall Hamill** have been elected vice presidents. Mr. Casselman has been manager of the firm's New York office; Mr. Roberts has been manager of new business; and Mr. Hamill has been administrative assistant to the president in the Boston office. **Frank C. L. Sperry** and **Edgar M. Hawkins** have been elected vice presidents of Stone & Webster Service Corp., a subsidiary management consultant concern.

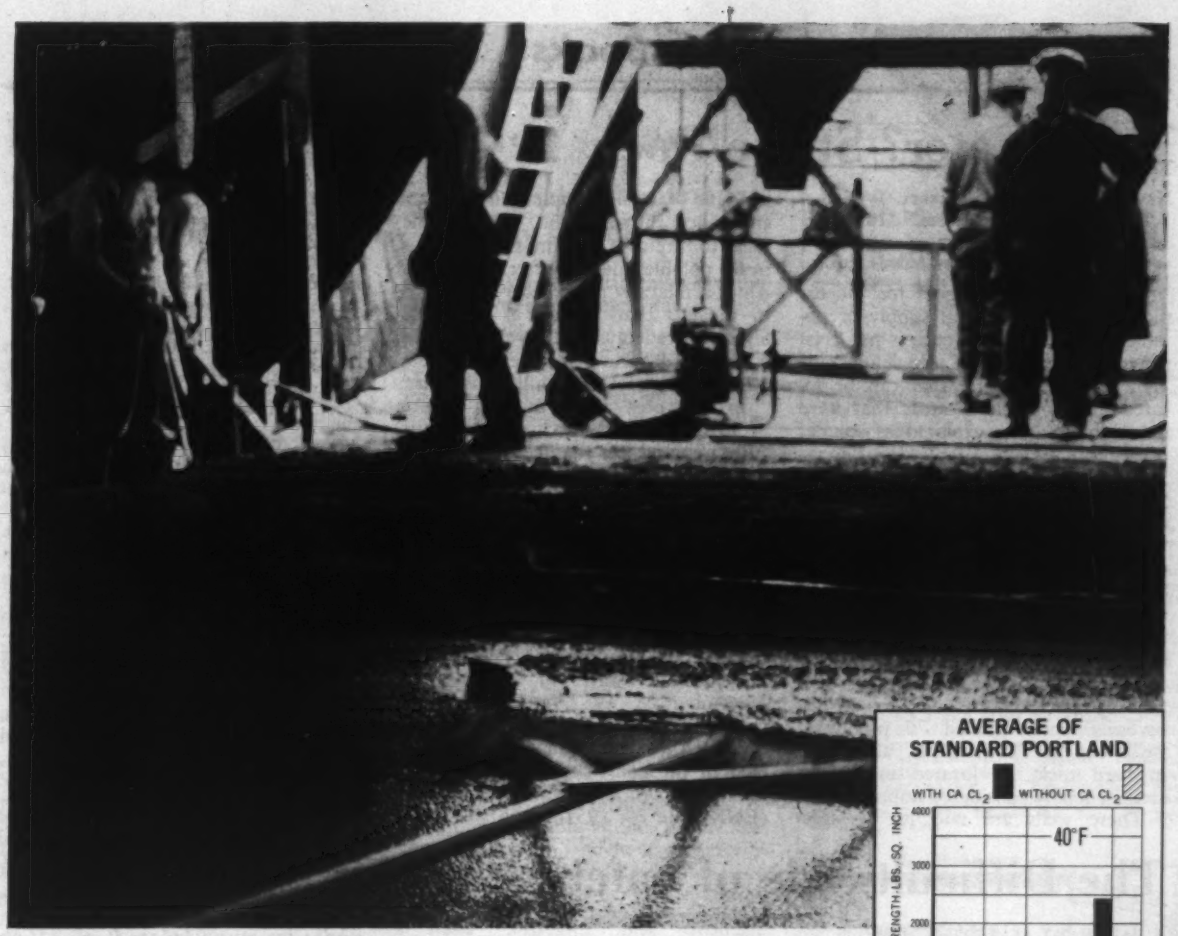
Perini Corp. of Framingham, Mass., has promoted **Hugh F. Doherty** to vice president and director of purchasing and **Louis R. Perini, Jr.,** to vice president for western operations.

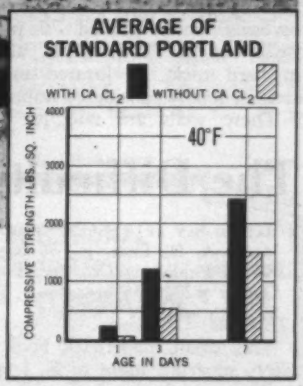
Samuel Weston has been appointed assistant to the president of Vermilya-Brown Co., New York City. He will specialize in housing projects of all types.

C. A. Budnik, formerly assistant manager of industrial construction for Kaiser Engineers, has been appointed general manager of the Titan Installation and Activation Division of American Machine & Foundry Co.'s Government Products Group.

Alfred A. Yee, formerly associated with Park & Yee Ltd., has established Alfred A. Yee & Associates, Structural Engineers, in Honolulu, Hawaii.

The Baltimore and Ohio Railroad has appointed **Clarence E. Jackman** to chief engineer for construction and maintenance. He will work out of Baltimore.





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Higher Early Strengths—at 40°F, you get 2-day strength in 1 day, 7-day strength in 3½ days. There's no cold weather lag in strength gain; your job stays on schedule. (See chart at right.)

Faster Initial Set—Under normal conditions, Columbia Calcium Chloride cuts initial set time from 3 hours to 1 hour. At lower temperatures, the effects are even more pronounced. You get finishers on and off the job faster, avoid costly overtime.

Early Form Removal—Rapid strength gain permits removal and re-use of forms in about half normal time.

Are you getting these Columbia Calcium Chloride cold weather benefits on your concrete jobs? If you aren't, why not analyze your batching procedure or contact your ready mix supplier today? Specify Columbia Calcium Chloride.

Let our Columbia Calcium Chloride engineers help you save money on your concrete work this season. For their assistance, just contact our District Sales Office nearest you or write our Pittsburgh Office.

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Need Water? Strike Rock

NEW WATER FOR A THIRSTY WORLD—By Michael H. Salzman, 210 pages. Science Foundation Press, Los Angeles, Calif. $5.95. Foreword by Aldous Huxley.

Michael Salzman argues for the exploitation of a plentiful supply of potable water whose existence is not even generally acknowledged. He defines this "new water" as water that can be located in the earth in areas that have not hitherto been explored as sources of water.

More specifically, he expounds on Stephan Riess' method of discovering water. Riess formulated a theory that "primary water" is constantly being formed in the earth by the combination of elemental hydrogen and oxygen, and that this water makes its way to near the surface where it can be located and tapped.

The author cites Riess' statement that up to 1954, his method of discovering water yielded 70 producing wells out of 72 attempts, all drilled in hard rock, all located in distress areas generally considered unproductive.

These wells are said to be independent of local precipitation for they are drilled through solid, impermeable rocks to intercept a fissure that contains fresh, potable flowing water. That this is not a radically new theory is attested by the fact that, as early as 1901, the Swedish Academy of Science nominated A. E. Nordenskiold to receive the first Nobel Prize for a similar discovery.

In a chapter on the modern science of hydrology and its limitations, the author emphasizes the need for expanding the hydrologic discipline by adopting a new point of view in the solution of water problems. "New water is one of the answers," asserts Mr. Salzman, "and it is available, within reasonable limitations, wherever igneous rocks exist."

Mr. Salzman is no stranger to ENR readers. He authored an article on new or "juvenile" water in the issue of November 28, 1957, p. 32. It grew out of correspondence regarding an unexplained flow of warm water encountered in the construction of a hospital in New York City earlier that year (ENR June 20, 1957, p. 46).

The Difficult Side of Safety

WHAT TO SAY AT A SAFETY MEETING—by Joseph A. De Luca, Jr., 50 pages, New Forum Publishing Co., Inc. Post Office Drawer #2724, Wilmington 5, Delaware, $2 with quantity discounts.

This small, paperback book by the safety superintendent of E. I. du Pont de Nemours & Co. deals with some of the abstract and intangible aspects of safety. It is largely a collection of suggested ideas and approaches that can be used or developed at meetings by those responsible for safety promotion.

It is essentially a "how to" book for foremen and supervisors.

The author's premise is that more accidents are caused by people than by things. Because things are easier to talk about, safety meetings tend to emphasize mechanical procedures and physical hazards and neglect the abstract side of safety.

The book is intended to help overcome this. It presents a number of practical abstract topics—such as day dreaming, self preservation, foolhardiness—and discusses their relationship to accidents and safety consciousness. Nearly half the book is devoted to 21 "big words," what they mean and how they affect safety performance. They include "complacent," "confused," "inattentive" and "forgetful." Each is suitable as a topic for safety meeting discussion.

Some sections of the book can be used verbatim. Other parts lend themselves to graphic illustrations or to posters that serve as safety reminders.

Although the publishers consider the book suitable for use by those with "high school and/or Ph.D. comprehension," it may prove too sophisticated for some.

Formwork Design

CONCRETE FORMWORK DESIGNER'S HANDBOOK—By H. R. Gill. 154 pages. Concrete Publications, Ltd., London. $3.50.

Latest in the "Concrete Series," this volume contains over 50 nomographs, tables and charts for designing timber, plywood, and steel formwork. It covers straight and curved walls, beams and slabs, dams and moving slipforms.

One chapter discusses the factors affecting lateral pressure of fresh concrete—e.g., placing rate, vibration, consistency, temperature, etc. Derivation of design formulas is given in an appendix.

Several fully worked examples illustrate the use of the design aids.

Just Published . . .

HIGHWAY ENGINEERING—Second edition, by Leo J. Ritter, Jr. and Radnor J. Paquette. 751 pages. Ronald Press Co., 15 E. 26th St., New York 10, N. Y. $10.00.

PHOTOGRAMMETRY—By Francis H. Moffitt, 455 pages. International Textbook Co., Scranton 15, Pa. $12.00.

TURBULENCE: AN INTRODUCTION TO ITS MECHANISM AND THEORY—By J. O. Hinze, 586 pages. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y. $15.00.

THE WORLD BENEATH THE CITY—By Robert Daley, 223 pages. J. B. Lippincott Co., E. Washington Square, Philadelphia, Pa. $3.95.

ARCHITECTURAL RENDERING—By Albert O. Halse, 277 pages. F. W. Dodge Corp., 119 W. 40th St., New York 18, N. Y. $15.75.

1959 COMPILATION OF ASTM STANDARDS ON COPPER AND COPPER ALLOYS B-5—720 pages. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. $7.50.

SHOPPING TOWNS USA—By Victor Gruen and Larry Smith, 288 pages. Reinhold Publishing Corporation, 430 Park Ave., New York 22, N. Y. $13.50.

PRINCIPLES OF ENGINEERING ECONOMY—Fourth edition, by Eugene L. Grant and W. Grant Ireson, 574 pages. The Ronald Press Co., 15 E. 26th St., New York 10, N. Y. $8.00.

HIGHWAY ENGINEERING HANDBOOK—1,696 pages. McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y. $25.00.

MANUAL ON INDUSTRIAL WATER AND INDUSTRIAL WASTE WATER—STP 148-D. Second edition, 670 pages. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. $11.00.

MANUAL OF PHOTOGRAPHIC INTERPRETATION—800 pages. American Society of Photogrammetry, 1515 Massachusetts Ave., N. W., Washington 5, D. C. $12.00 (members A.S.P.); $15.00 (nonmembers).

RADARGRAMMETRY—By Daniel Levine, 330 pages. McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y. $12.00.

RIVER STUDIES AND RECOMMENDATIONS ON IMPROVEMENT OF NIGER AND BENUE—North-Holland Publishing Company, P. O. Box 103, Amsterdam, Holland. $19.80.

SIMPLIFIED DESIGN OF REINFORCED CONCRETE—Second edition, by Harry Parker, 303 pages. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. $6.50.

THE TECHNIQUES OF URBAN ECONOMIC ANALYSIS—410 pages. Chandler-Davis Publishing Co., P. O. Box 36, West Trenton, N. J. Soft bound $4.25; hard cover $5.00.

CONCRETE FORMWORK DESIGNER'S HANDBOOK—By H. R. Gill, 153 pages. Concrete Publications Limited, 14 Dartmouth St., Westminster, S. W. 1, England. $3.50.

It Wasn't the Contractor's Fault

Court refuses to hold a contractor liable for damages that resulted from his use of faulty specifications

A contractor is required to build according to plans and specifications. If defects develop in the work, it is the fault of the party that prepares the plans and specifications.

The application of the rule is illustrated by the following federal case:

Bradford Builders, Inc., had the general contract for the erection of a public school. The plans and specifications called for the enclosure of the property by a wire fence, supported by metal posts, set in concrete. On July 5, 1956, Sears, Roebuck & Co. entered into a subcontract to erect the fence. The subcontract contained a provision to the effect that the subcontractor would not sublet any portion of the work, except with the general contractor's written consent.

Prior thereto, on March 8, 1956, Sears had entered into a general contract with Jack Wilson, under which Wilson agreed, for a three year term, to accept all jobs for the installation of fence materials tendered by Sears. Wilson's contract with Sears contained a typical broad indemnity agreement to save Sears harmless from any claim, demand or suit against it by reason of any negligence or breach of contract arising directly or indirectly from any act in connection with any installation or job undertaken pursuant to the contract. This Wilson contract was in force during the pertinent period.

Sears tendered the Bradford job to Wilson with full knowledge of Mr. Ginder, who was Bradford's superintendent on the job. Ginder furnished Wilson with a complete set of plans and specifications which showed the exact location at which the fence was to be erected. The plans also showed the location of the underground cable which was close to and diagonal to the fence line but did not touch the fence line.

In digging a post-hole for the fence, Wilson broke through the concrete conduit and cut the cable. Bradford incurred an expense of $3,169.46 in repairing and replacing the conduit and cable.

Bradford brought an action against Sears to recover for the cost of repairing the damage done by Wilson. The action was based on negligence and breach of contract by subletting the work to Wilson. Sears also counterclaimed for the balance due it under the contract. The court found for Sears, holding that Bradford had full knowledge of the fact that Sears had subcontracted the work and accepted the work as performed by Wilson and had turned over to the school board the work that had been performed by Wilson. As to the claim that the damage resulted from negligence on the part of Wilson, this was dismissed on the ground that he had performed the work in accordance with the plans and specifications and that the damage resulted from the failure of the plans to properly indicate the location of the conduit and cable. This judgment was affirmed on appeal.[1]

The appellate court stated: "We consider the following statement by the Supreme Court in United States v. Spearin, 248 U.S. 132, 39 S. Ct. 59, 61, 63 L. Ed. 166, aptly sets forth the governing principle of law as to this contention: '. . . if the contractor is bound to build according to plans and specifications prepared by the owner, the contractor will not be responsible for the consequences of defects in the plans and specifications. MacKnight Flintic Stone Co. v. The Mayor, 160 N.Y. 72, 54 N.E. 661; Filbert v. City of Philadelphia, 181 Pa. 530, 37 A. 545; Bentley v. State, 73 Wis. 416, 41 N.W. 338. See Sundstrom v. State, 213 N.Y. 68, 106 N.E. 924. This responsibility of the owner is not overcome by the usual clauses requiring builders to visit the site, to check the plans, and to inform themselves of the requirements of the work, as is shown by Christie v. United States, 237 U.S. 234, 35 S. Ct. 565, 59 L. Ed. 933, Hollerbach v. United States, 233 U.S. 165, 34 S. Ct. 553, 58 L. Ed. 898, and United States v. Utah, Nevada & California Stage Co., 199 U.S. 414, 424, 26 S. Ct. 69, 50 L. Ed. 251, 252, 255, where it was held that the contractor should be relieved, if he was misled by erroneous statements in the specifications.

"'. . . the insertion of the articles prescribing the character, dimensions and location of the sewer imported a warranty that if the specifications were complied with, the sewer would be adequate. This implied warranty is not overcome by the general clauses requir-

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• **FLINTSEAL JFR*** (Hot poured) A one-component, rubber-tar thermoplastic compound to be melted and poured. Cools quickly, retains tough, elastic bond in pavement joints and cracks through cycles of expansion and contraction. Fed. Spec. SS-S-167b.

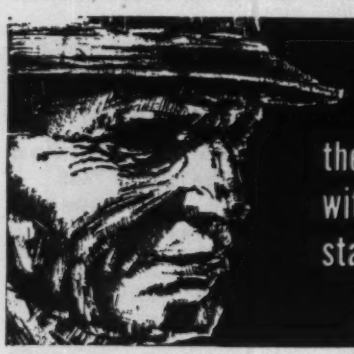
• **FLINTKOTE M-200** (Cold-Applied) Two-component, polymer type sealer. Sets quickly, resists aircraft fuel, heat and blast from jets. Bonds perfectly to concrete and remains ductile at minus 20°F. Interim Fed. Spec. SS-S-00200a and pertinent Purchase Descriptions, as modified.

• Also ask about exciting new Flintcrete†—Flintkote's polysulfide/epoxy concrete bonding compound for pavement restoration and repair.
• And Flintar*-coal tar pitch emulsion. Fed. Spec. R-P-00355a for sealcoating bituminous pavements. Write: The Flintkote Company, P. O. Box 157, Whippany, New Jersey.

*Reg. U.S. Pat. Off. †T.M. of The Flintkote Company

FLINTKOTE

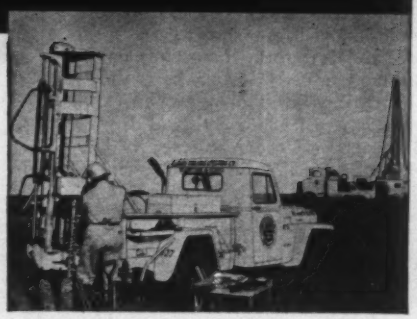
Manufacturer of diversified products for home and industry



the man who backs his skill with Mobile Drill has a head start on any job he wants!

EXPERIENCE *plus* MOBILE DRILLS TEAM-UP FOR TOP PRODUCTION

Across Europe, through Asia, out of Africa, to the Americas, the Aimi brothers have logged over 20 years of drilling experience. They say, "The B-27 and B-52 give us maximum production. Rugged, versatile—either rig easily samples 100′ per day even in unpredictable Chicago area soils."



B-27 left, and B-52 Pacemaker on foundation testing job. Operated by C. J. and M. C. Aimi, owners of Illinois Drilling & Testing Co., Elmwood Park, Illinois.

Bulletin #1960-2 describes testing job in difficult Chicago soils. Write today for your copy . . .

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ing the contractor to examine the site, to check up the plans, and to assume responsibility for the work until completion and acceptance.'".

The principle of law involved may be briefly summarized that when a contractor performs the work in accordance with the plans and specifications, he has fulfilled his contract. If defaults develop in the work it is the fault of the party that prepares the plans and specifications, not the contractor.

(1) Bradford Builders Inc. v. Sears, Roebuck & Co., 270 F. 2d 649, U.S. Court of Appeals, October 6, 1959.

Court Enforces a Lien Against Leased Property

A mechanic's lien may attach to property under a contract between a lessee and a contractor.

The following Illinois case illustrates some of the circumstances under which such a lien may attach.

The lessees of a building entered into a contract to install a complete electric wiring system.

The owner of the building was on the premises during the time the work was being performed, had recommended the contractor to the lessee, and at all times had knowledge of the contract. He knowingly permitted the work to be done without entering an objection.

The contractor brought an action to foreclose a mechanic's lien on the property and was granted a judgment.[1]

One of the defenses of the owner was that the wiring system constituted fixtures and no lien would attach.

The evidence showed that part of the system was installed within the walls with conduits attached by metal strips and screws to the walls, and outlets were placed both in the walls and floor. The court held that under such circumstances, the electric wiring system was not a trade fixture but a permanent improvement to the real estate and was not removable at will without damage to the building and that the work done was lienable.

(1) Babiak, Jr. v. Strum, 155 N.E. 2d 332, Appellate Court of Illinois, Jan. 21, 1959.

These summaries of court decisions are prepared by I. Vernon Werbin, Esq., New York attorney and licensed professional engineer, who is author of the following books published by McGraw-Hill Book Company, Inc.: *Legal Phases of Construction Contracts; Legal Guide for Contractors, Architects and Engineers; and Legal Cases for Contractors, Architects and Engineers.*

$2,540 difference in $11-million bid . . .

'Change' Takes Cannonsville Dam

The Cannonsville Dam near Deposit, N. Y., drew nine bids ranging from a low of $11,695,110 to a high of $18,622,580. The 175-ft-high earthfill dam is a feature of the third and final stage of New York City's Delaware water supply system. The entire third stage is to cost about $60 million.

The low bid placed by the Lane Construction Corp., Meriden, Conn., took the contract at a price only $2,540 under the second bid of S. J. Groves & Sons Co., Syracuse, N. Y. It was 37% below the high bid of Geo. M. Brewster & Son, Inc., Bogota, N. J., bidding with MacLean-Grove Company, Inc., New York City.

The dam, on the West Branch of the Delaware River, will impound 280,000 acre-ft and add about 310 mgd to New York City's water supply. On Lane's low bid, this averages $30.78 per mgd.

Work includes miscellaneous appurtenances, stream control and plugging of diversion conduit, excavation, embankment, surface dressing and grassing, pumping, sanitary services, and other related work.

Minimum wage rates specified in the proposal are: $2.62 plus $0.10 health and welfare; $3.59 for carpenters; for tractor operators $3.83 plus $0.30 health, welfare and pension; and for shovel operators $4.55 plus $0.30 HW and P.

The bidding included:

1C	Lane Constr. Corp., Meriden, Conn	$11,695,110
2	S. J. Groves & Sons Co., Syracuse, N. Y.	11,697,650
9	Geo. M. Brewster & Son, Inc., Bogota, N. J. & MacLean-Grove Co., Inc., N.Y.C.	18,622,850

Bids: 6-21-60 Items	Unit	Quantity	Unit Prices 1C	2
Borings	lf	3,000	$6.00	$12.00
Buildings removed	sf	11,000	2.00	0.40
Excavation, earth	cy	2,500,000	0.80	0.58
rock	cy	600,000	3.00	2.65
Embankment, rolled imperv	cy	1,500,000	1.50	1.65
semi-pervious	cy	1,100,000	0.23	0.50
Refill & embanking	cy	120,000	0.20	1.25
Rock embankment	cy	450,000	1.00	1.25
Riprap, light	cy	500,000	3.00	1.25
heavy	cy	9,000	35.00	40.00
Surf dress & grass	cy	55,000	2.00	2.25
Timber & lumber	Mfbm	90	400.00	350.00
Rubber water stops	lb	1,700	2.00	2.00
Masonry, concrete	cy	17,000	40.00	60.00
dry rubble & paving	cy	300	35.00	32.00
rubble & pav in mortar	cy	500	50.00	40.00
granite	cy	550	300.00	300.00
Stone facing	cy	5,000	75.00	80.00
Prot ctg of mortar cement	cy	600	40.00	50.00
Drill holes in rock, msnry	lf	25,000	1.25	7.00
Grout, steel pipes for	lb	13,500	0.60	0.40
connections for	ea	450	25.00	12.00
mix & place	cy	2,300	30.00	45.00
Portland cement	bbl	50,000	6.00	5.50
Gravel, run of bank	cy	20,000	2.50	2.75
Cr stone & gravel	cy	375	20.00	12.00
Sand for filters, grout, prot ctgs of cmt mortar	cy	825	10.00	8.00
Asph conc pavement	t	1,900	14.00	16.00
Non-metal pipes	lf	19,500	2.50	3.00
Steel, reinf for conc	lb	550,000	0.15	0.15
structural	lb	120,000	0.20	0.30
release water conduit	lb	340,000	0.45	0.62
clad pipes	lb	140,000	1.10	2.00
stainless pipes	lb	16,500	3.60	4.50
Misc metal pipes	lb	50,000	0.60	0.55
Aluminum articles	lb	22,000	2.50	2.60
Misc metal work	lb	60,000	0.70	0.95
Guide rail, beam type	lf	1,400	2.50	4.00
City-furn met wk & equip, care for, instal & test	lb	500,000	0.20	0.13
Chlor & treat pumpage (machine month)	mo	200	200.00	80.00
Liq chlor, alum & lime	lb	175,000	0.15	0.17
Maintain & service engrs office & soils lab	mo	50	100.00	465.00
Pipe couplings	ls	job	35,000	49,950
Dehumidifying equipment	ls	job	5,000	8,640
Misc equipment	ls	job	20,000	15,525
Pumping	ls	job	60,000	225,000
Control stream & plug diversion conduit	ls	job	45,000	33,750
Sanitary services	ls	job	70,000	58,995
Clean up	ls	job	68,000	20,250

Completion schedule: 54 months

Steel Water Tank Costs $165/Thousand Gallons

Wrightsville, Ga., took bids on Feb. 23 on a 250,000-gal elevated steel water tank and a gravel-wall type well approximately 300 ft deep. Zimmerman, Evans & Leopold, Augusta, Ga., was the consultant.

The award at $41,200 on the tank went to Chicago Bridge & Tank Co. It averages $164.80 per 1,000 gal of capacity.

The $14,360 contract for the deep well went to Gray Well & Pump Co. The combined awards, totaling $55,560, were 7.4% under the engineers estimate.

Tank dimensions are: 40 ft dia 88 ft to bottom and 117 ft to top of tank capacity; riser dia 4 ft.

The well contract includes drilling, casing, testing, and pumping equipment with automatic controls.

Air Force Base Theatre Costs $504 per Seat

At an over-all cost of $503.82 per seat, a 500-seat base theatre is being built at the Bunker Hill Air Force Base, Peru, Ind. A-E Fleck, Quebe and Reid Associates, Inc., Indianapolis, is the consultant.

The award at $251,911, to James I. Barnes Construction Co., Logansport, Ind., was 4.8% under the engineers estimate.

The structural steel and masonry theatre building will be 61x148 ft. Theatre price also includes a 200x210-ft bituminous paving addition to a parking area adjacent to the theatre.

Construction commenced Feb. 26 and completion is scheduled for Dec. 26. Liquidated damages are $125/calendar day.

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But often forgetting the postal zone number when you address an envelope can delay your letter long enough to miss the appointed round. There are 106 cities in America where a complete address includes a zone number. Always use it when writing to or from these cities.

Materials Prices

Monthly Market Quotations by ENR Field Reporters

CEMENT, AGGREGATE, READY-MIXED CONCRETE—F. O. B. CITY

	PORTLAND CEMENT* Per bbl. C/L lots cash, dis. not deducted			SAND AND GRAVEL Per ton, carload lots			CRUSHED STONE Per ton, carload lots		CRUSHED SLAG Per ton, carload lots, f.o.b. plant		CONCRETE BLOCK 8x8x16-in.,* truckload del.* per block		CONCRETE Ready Mixed 1:2:4 del. per cy
	Paper	Bulk	Mortar	Gravel, 1½ in.	Gravel, ¾ in.	Sand	1½ in.	¾ in.	1½ in.	¾ in.	Sand grav.	Lt. wgt. agg.	50 cy & over
Atlanta	$4.38a‡	$3.88a‡	$3.68a‡	$3.10a‡	$3.10a‡	$1.85‡a	$2.18a	$2.33a	$1.65r	$1.75r	$0.175o	$0.21o	$13.75g
Baltimore	4.42a	3.91a	3.56a	2.80‡a	2.80‡a	2.25‡a	2.85‡a	2.90‡a	2.05‡a	2.00‡a	.18a	.18a	13.50ou
Birmingham	4.43c	3.50f	.....	2.53ns	2.53ns	2.13ns	2.75a	2.75a	1.65d	1.75d	.19	.19	14.25g
Boston	5.83ip	4.82ap	4.90imp	3.00qx	3.00qx	3.00qx	1.75qx	1.85qx	.....	.....	.23o	.278ao	15.00q
Chicago	4.52ag	4.02ag	4.15g	3.78‡e	3.78‡e	4.13‡e	3.95‡e	3.95‡e	2.25‡e	2.25‡e	.261e	.261e	13.50e
Cincinnati	4.84c	4.34c	4.31c	2.29‡cu	2.34‡cu	2.44‡cu	2.55‡cu	2.74‡cu	1.80u	1.80u	.19o	.25ao	15.00qr
Cleveland	4.77/.84‡	.....	4.19‡ae	.....	2.25ae	1.75ae	2.70f/y	2.70f/y	2.20‡f	2.20‡f	.....	.23f	17.25u
Dallas	3.65a	3.25a	3.53a	2.65‡a	2.75‡a	1.90‡	2.47	2.67	.....	.....	.....	.285	12.10z
Denver	4.89a	4.39a	4.89	1.95‡	2.15‡	1.42‡b	.....	3.00‡x	.....	.....	.25	.27ao	11.90
Detroit	4.50a	3.89aqg	3.97a	2.50cc	2.50cc	2.16cc	2.80ddbm	2.80ddbm	3.15ddaa	3.50ddaqaa	.24u	.37‡ou	15.50eaa
Kansas City	4.52a	3.92a	4.30a	.....	.....	1.85‡a	2.00‡a	2.00‡a	.....	.....	.22a	.26c	14.50
Los Angeles‡‡	5.12eh	4.68eh	5.60c	2.56‡at	2.76‡at	2.41‡at	2.41‡at	2.46‡at	.....	.....	225f	.385	12.46klz
Minneapolis	4.66a	4.15a	4.25a	2.70‡ae	2.70‡ae	1.60‡ae	3.95‡ae	3.95‡ae	.....	.....	20q	.....	14.20f
Montreal	3.36‡dr†	3.11‡dr†	3.72‡dr†	1.90‡a†	2.15‡a†	2.40‡a	1.90‡†	2.15‡†	2.00†	2.00†	.20†	.28‡†	10.80sk†
New Orleans	4.17b	3.65b	3.97b	2.61b	2.61b	2.16b	.....	.....	1.65d	1.75d	.25r	.25	14.00o
New York	4.68a	4.18a	3.75a	..	3.20bk	2.30bkw	2.85‡bb	2.85‡bb	.....	.....	.265nwo	.32bwo	17.60ay
Philadelphia	4.49‡ae	3.99‡ae	3.51‡e	1.95‡a	1.95‡a	1.55‡a	2.00‡a	2.30‡a	2.25‡a	2.25‡a	.....	.225	13.90z
Pittsburgh	5.65bjk	4.62bj	5.00bjl	2.68‡aqr	2.68‡aqr	3.08‡aqr	2.00‡aqr	2.00‡aqr	2.10w	2.10w	.22rz	.22rz	16.15o
St. Louis‡‡	4.54a	4.04a	4.24a	3.40‡as	3.40‡as	2.40/3.40‡as	1.75‡s	1.75‡s	.....	.....	.26‡e	.32‡eo	13.65/14.10q
San Francisco	4.34c	3.79c	4.78c	2.02	2.02	2.12	2.17	2.17	.....	.....	.24	.28cl	13.00ew
Seattle	4.47‡a	3.75aq	4.65a	4.25‡bm	4.25‡bm	4.25‡bm	4.50‡bm	4.50‡bm	.....	.....	.288s	.384cs	14.70f
Toronto	5.20i	3.84t	5.20i	2.40	2.40	2.05	2.40	2.40	2.40	2.40	.26	.285cu	13.75q

‡ Delivered. * Prices incl. dealers discount except as noted. ♯ Add 4% sales tax. ♯♯ Add 2% intrastate sales tax. R Revised. † Plus 6% Mun & Prov tax.

CEMENT: *a Less 10¢ disc. 15 days. *b Less 2% disc. 15 days. *c Less 10¢ disc. 10 days. *d 10¢ disc. 20 days. *e Truckload lots. *f Fob mill, add $14.58 to $21.31 per car switching charges. *g fob mill + freight. *h LCL. *i Less 2% disc. 10 days. *j Truck lots, fob yard. *k 100 bag lots *l over 150 sacks. *m Sold in bags only. *n Less 5% disc. 30 days. *o Plus 50¢ for Sat. del. *p 5-8 ton truckload. *q F.o.b. mill *s In bags & bbl. Only *t min. 7 tons

SAND, GRAVEL, STONE & SLAG: *a Truck lots. *b Per cu. yd. *c 5 tons up. *d Less 5¢ disc. 10 days. *e Less 2% disc. 10th. *f Less 2% disc. 15th. *g Less 5% for cash. *h Less than 5 tons. *j F.o.b. quarry. *k Barge lots asd. *l F.o.b. scow Hudson river. *m Less 2% for cash. *n F.o.b. cars. *q F.o.b. yard. *r less 5% disc. 15th. *s Less 2% disc. 10 days. *t Less 10¢ disc. 10 days. *u Less 5¢ disc. 10 days. *v Less 2% disc. 15 days. *w Less 10¢ disc. 15 days. *x Incl. 35¢ switch. charge. *y F.o.b. dock. *z 5-8 tons. *aa Less 8% disc. 15 days. *bb Less 2% 25th of month *cc F.o.b. plant cl *dd F.o.b. plant tl

CONCRETE BLOCK: *a Cinder. *b Waylite. *c Haydite. *d Celocrete, *e 8¼ x 8 x 12 in. *f 8 x 4 x 16. *g F.o.b. truck at job. *j F.o.b. plant San Rafael. *m F.o.b. yard. *n 8 x 8 x 16. *o Less 2% disc. 10 days. *p Less 2% disc. 10th. *q Less 5% disc. 10th. *r Less 2% disc. 15 days. *s Less 2% disc. cash. *t Siporex, 7 x 8 x 16. *u Less 8% disc. 10 days. *v Less 12% disc. 15th.

READY MIXED CONCRETE: *a 6 cu yd or over del. Man. *b 25 cu yds or more *c 10-100 cy. *d 1-3 mi. zone add 15¢ for ea. add'l 1-mi. zone. *e 3,000 lb comp. *f 2,500 lb. comp., less 8% disc. 30 days. *g Less 25¢ disc. 15 days. *h Less 50¢ for cash. *i 5% off for cash. *j 2% off for cash. *k Federal tax included. Add 6% mun. & prov. tax. *l 1:2¼:3½ base price. *m F.o.b. yard. *n Plus escalator clause. *o Less 2% disc. 15 days. *p Less 50¢ disc. 15 days. *q Less 2% disc. 10 days. Add 50¢ per zone. *r 2000 wgt. *s Less 8% disc. 10 days. *t Incl. 50¢ heating. *u Less 2% disc. 15th. *v Sat. del.+50¢. *w 10-100 cy. *x Del in zone 20-B. *y less 25¢, 10 days. *z less 1% in 30 days. *aa 6 bag mix

CURRENT MAXIMUM PRICES AT CEMENT MILLS: Subject to 10¢ discount, 15 days. For paper bags add 50¢ per bbl., not refundable *Prices guaranteed through December 31, 1960*

	Bulk		Bulk		Bulk		Bulk		Bulk
Richard City, Tenn	$3.55	Buffington, Ind	$3.55	Steelton, Minn	$3.60	Muskegon, Mich	$3.55	Toledo, O	$3.60
Clinchfield, Ga	3.55	Independence, Kan	3.35	Leeds, Ala	3.40	Saginaw, Mich	3.60	Milwaukee, Wis	3.50
Kingsport, Tenn	3.55	Hannibal, Mo	3.50	Duluth, Minn	3.60	Wyandotte, Mich	3.60	Green Bay, Wis	3.50
West Des Moines, Iowa	3.60	Northampton, Pa	3.50	Hudson, N. Y	3.50	Buffalo, N. Y	3.55	Ironton, O	3.55
Nazareth, Pa	3.50	Universal, Pa	3.60	Alpena, Mich	3.50	Oswego, N. Y	3.60	Montreal, Can	2.81
Bath, Pa	3.50	Waco, Tex. (+ 10¢ tax)	3.35	Detroit, Mich	3.60	Cleveland, O	3.65	W. Winfield, Pa	3.60
Leeley, Pa	3.50	Giant, S. C	3.55	Howes Cave, N. Y	3.50	Alsen, N. Y	3.50	Security, Md	3.50

PAVING BRICK, BLOCK, ASPHALT, ROAD OILS—F. O. B. CITY

	PAVING BRICK AND BLOCK			PAVING ASPHALT		ASPHALT BINDERS—FLUXES		CUTBACK ASPHALT MC		ROAD OIL	ASPHALT EMULSION RSI	
	Granite Per M lots of 50,000 4x4x8 in.	Brick per M 3x4x8½ in. carload lots	Wood per sq. yd. 3½ in. 16-lb. treat	Per ton, less than 80 penetration		Per gal., 80-300 penetration		per ton		Per gal.	Per gal.	
				Tank car	Drums	Tank car	Drums	Tank car	Drums	Tank car	Tank car	Drums
Atlanta	e	e	e	$28.70PS	$45.00PS	$0.2740PS	$0.235S	$0.1308wS	$0.245wS	$0.1258S	$0.1328S	$0.245
Baltimore	e	e	e	21.00i	.....	.09i	0.18i	.09iwE	.18iwE	.095f	.10i	0.19i
Birmingham	.....	66.00i	.....	25.12	25.89O	.1069	0.1093O	.1162w	.1188Ow	.1006O	.1069	0.1093O
Boston	.....	.....	.....	22.00apS	46.00apS	22.00asS	46.00asS	.105awF	.22awF	.14aOR	.15OR	.....
Chicago	150.00‡a	95.00‡ab	3.95/4.00‡aj	22.00b	32.00b	20.40bv	30.40bv	.10bwH	.18bwH	.08b	.....	.....
Cincinnati	.....	.....	.....	26.00SU	.....	26.00ff	.....	.1165wSU	.....	.109	.1265	.....
Cleveland	.....	89.50‡d	6.30	26.00tA	.....	26.00tvA	.....	.1165twAF	.....	.....	.1265tA	.21A
Dallas	e	40/80p	e	26.90	46.35	.1138	.1983	30.50	52.45	.1100	.1138	.1983
Denver	.....	82.00a	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Detroit	.....	114.00	.....	31.50R	.....	32.20wR	.....	30.24wIR	.....	27.84	.....	.24
Kansas City	e	e	e	18.75cl	.....	18.75cl	.....	.0875J	.....	.0675c	0.10	.....
Los Angeles‡	e	e	e	19.00dmz	.....	19.00dez	.....	20.50dKx	.....	19.50dnaa	21.40iXv	.1842jXv
Minneapolis	.....	.....	3.73h	23.70	.....	23.70v	.....	.105w	.....	0.95	.1375bb	.....
Montreal	e	e	e	30.50n	43.60n	.167n	.211n	17.80nwE	22.20nwE	.155n	.242n	.27nX
New Orleans	e	e	e	20.00e	.....	20.00ev	.....	.095ew	.....	.085eB	.095eBL	.1905eB
New York	.....	.....	3.70f	20.99mO	42.95mO	20.99vIO	42.94vIO	9.61uF	19.01uF	.....	9.68u	19.11u
Philadelphia	.....	.....	.....	21U	.....	21U	.....	.095Uw	.....	.095U	.....	.....
Pittsburgh	60.00k	95.00m	6.35n	31.20ix	.....	31.20ivx	.....	.1403IS	.....	.142S	.1403i	.....
St. Louis‡‡	.....	.....	.....	19.74f	21.65	.1825f	.1825	.09fw	.092fw	0.165f	.1825O	.30R
San Francisco	.....	70.00	.....	22.50qdd	41.00qdd	22.50pkvdd	40.00pkvdd	22.50qNdd	46.50qNdd	23.25qWdd	23.50qXdd	.2023qXdd
Seattle	.....	.....	.....	24.00s	47.00h	33.00scc	38.50	25.50KE	.....	28.75ksY	25.80ksX	49.80krX
Toronto	.....	139.00‡	4.50f	38.90	59.01ee	0.2075	0.2773ee	0.222w	0.2704wee	0.233	0.2122Ze	.2682ze

‡ Delivered. ♯ Add 4% sales tax. ♯♯ Add 2% intrastate sales tax. R Revised.

PAVING BRICK & BLOCK: *a Less 2% disc. 10th. *b 3 x 3½ x 8. *c 2½ x 8½ x 4. *d Truckload lots. *e Not used. *f 2" interior 6 lb tr. *g Less $1/Mdisc. 15th. *h 2" tr, 6 lb. *i 3 x 3½ x 8½. *j 2½", 6 lb. tr. *k Used. *l Redshale. *m Pine; oak $6.57. *n Truck del. *o Less $1/M disc. 15 days. *p Used: $40: new: $80.

ASPHALTS: *a F.o.b. refinery, Everett, Mass. *b F.o.b. refinery, Lockport, Ill. *c F.o.b. Sugar Creek, Mo. *d F.o.b. refinery, El Segundo. *e F.o.b. Baton Rouge. *f F.o.b. Hartford, Ill. *g F.o.b. refinery, Richmond, Calif. *h F.o.b. Martinez. *i F.o.b. refinery, Baltimore. *j F.o.b. refinery, Inglewood, Calif. *k 50-110 penetr. *l Less than 100 penetr. *m 40/300 penetr. *n F.o.b. refinery, Montreal. Fed. tax included; add 6% for mun. & prov *o Drums not avail. Shipped in steel bbl. *p 60/70 penetr. *r In customer's drums. *s Shipped in drums, per drum. *t 150/300 penetr. *u Per 100 gal. *v Per ton. *w Per gal. *x Also tank trucks *y F.o.b. Oakland. *z F.o.b. Edmonds. *A F.o.b. refinery, Cleveland, *B F.o.b. Destrehan, La. *E RC. *F Also RC. *G Also MS *H RC 0-5 incl. *I MC 4. *J MC, RC $0.095. *K MC 3, 4, & 5. *L MS. *M MC 1-5, RC 1-5, $0.0918. *N MC 3. *O Truck-load. *P F.o.b. refinery, Atlanta. *Q F.o.b. Eldorado, Ark. *R Delivered within 50 mi. *S Less 2% disc. 10 days, net 30. *T Less 1% disc. 10 days. *U F.o.b. refinery. *V Less 2% disc. 15 days. *W SC 2. *X RS 1. *Y SC 1. *Z Incl. 10% Sales Tax. *aa SC 3, 4, & 5. *bb RS 3. *cc In used drums. *dd ess disc of $1 ton. ee 45 Imp. gal. drums *ff 60-150 penetration

See following ENR issues for OTHER PRICES:

- Wood Products, Glass, Explosives, Chemicals: Last, Aug. 18; Next, Sept. 22.
- Clay Products, Lime, Plaster, Paint, Roofing: Last, Aug. 25; Next, Sep. 29.
- Wage Rates, Building Board Insulation: Last, Sep. 1; Next, Sep. 29.
- Iron & Steel Products, Pipe: Last, Aug. 11; Next, Sep. 15.

Construction Reports

Bids Asked—Low Bidders—Contracts Awarded—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager J. A. MAHONEY, M. WETZEL, M. E. SCIORRA, MARIE MORAVSIK, ELIZABETH WERRA, ELEANOR QUERET, Reports, J. H. WEBBER, E. R. HUBER, Statistics.

NEW ENGLAND

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

STREETS AND ROADS

September 14 Maine September 15 New Hampshire

BUILDINGS—BA

▲ **Conn., West Haven**—HIGH SCHOOL—BA 10/11—Bd. Educ., 270 Main St., 3 story, V-shaped high school, Kelsey Ave. $4,000,000. Plans deposit $300. Polak & Sullivan, 1397 Chapel St., New Haven, archts. Arthur G. Beaulieu Assocs., 2348 Whitney Ave., Hamden, engrs. CD 5/22/59.

HEAVY CONSTRUCTION—LB & CA

▲ **MASSACHUSETTS**—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston, Bids opened 7/19, **Charles Capone Constr. Co. Inc.**, 850A Providence Hy., Dedham, Mass., LB **$3,274,570**, (7 bidders), wid'n. section Rte. 128, incl. work on ten bridges. U-272 (44), Waltham. CD 6/29.

▲ **MASSACHUSETTS**—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston, Bids opened 7/26, **Marinucci Bros. & Co. Inc.**, 51 Ceylon St., Dorchester, Mass., LB **$3,320,338**, (7 bidders), hy. and bridge Int. Rte. 195.1-195-3 (20)8, Somerset and Swansea. CD 7/6.

BUILDINGS—LB & CA

▲† **Urban Constr. Co.**, 2 Lafayette St., New York, N. Y., CA **$7,871,906**, 480 unit Capehart HOUSING, Dow Air Force Base, IFB 17-601-60-37, BANGOR, ME. Base Procurement Office, Dow Air Force Base, Bangor, Me. Bids Aug. 4, CD 8/8, under LB.

▲ **Green Manor Constr. Co., Inc.**, 382 W. Middle Tpk., Manchester, Conn., Owner Builds, **$3,245,970**, 203 HOUSES, High Ridge West, Parker St., MANCHESTER, CONN.

▲ **Hilton Constr. Co.** 185 Church St., New Haven, Conn., Owner Builds, **$7,300,000** 160 HOUSES, "Maple Vale Estates," Newton Rd, WOODRIDGE, CONN. CD 5/16.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

September 13 Maryland September 14 Delaware

September 16 Pennsylvania

STREETS AND ROADS

September 13 Maryland September 14 New Jersey

September 16 Pennsylvania

BUILDINGS—BA

▲ **N. Y., New York**—SCHOOL—BA 9/20—Supt. Design, Constr. and Physical Plant, Bureau Constr., 4 Floor, 42-15 Crescent St., Long Island City 1, general contract, plumbing and drainage, heating and ventilating, electrical work and lighting fixtures P. S. 30 addn., modernization, 141 St. and Brook Ave., Bronx Boro. Plans deposit $25 general $10. mechanical trades. CD 1/25.

▲ **N. Y., Brooklyn**—SCHOOL—BA 9/21—Supt. Design, Constr. and Physical Plant, Bureau of Constr., 4 Floor, 42-15 Crescent St., Long Island City, Zone 1, general contract, plumbing and drainage, heating and ventilating, electrical work and lighting fixtures P. S. 282, 6 Ave. between Berkeley Pl. and Lincoln, Brooklyn Boro. Plans deposit $25 general, $15 mechanical trades. A combination lump sum bid with School 294 is invited. CD 1/25.

▲ **N. Y., Brooklyn**—SCHOOL—BA 9/21—Supt. Design, Constr. and Physical Plant, Bureau Constr., 4 Floor, 42-15 Crescent St., Long Island City, Zone 1, general contract, plumbing and drainage, heating and ventilating, electrical work and lighting fixtures Junior High School 294, DeKalb Ave. between Carlton Ave. and Adelphi St., Brooklyn Boro. Plans deposit $25 general, $15 mechanical trades. A combination lump sum bid with School 282 is invited. CD 10/12/59.

▲ **Pa., Phila.**—SCHOOL—BA 9/22—Bd. Educ., 21st and Parkway, Junior-Senior High School, Bustleton Pike, $5,500,000. Plans deposit $110. Martin Stewart & Noble, 117 S. 17th St., archts. Allaback & Renis, 16 S. Broad St., engrs. CD 1/26/59.

▲ **N. Y., Brooklyn**—SCHOOL—BA 9/23—Supt. Design, Constr. & Physical Plant, Bureau Constr., 4th Fl., 42-15 Crescent St., Long Island City, Zone 1, general constr., plumbing and drainage, heating and ventilating, electrical work and lighting fixtures for P. S. 257, Varet and Humboldt Sts., Brooklyn Boro. Plans deposit $25 for general, $10 mechanical trades. CD 8/5, under LB.

BUILDINGS—SLC

▲ **Pa., Phila.**—OFFICE—Bell Telephone Co. of Pa., Widener Bldg., soon lets contract, Headquarters Bldg., 16th and Arch Sts., $14,500,000. Maurice Fletcher, 226 S. 16th St., archt. Kneas & Long, 504 Woodland Terrace, engrs. CD 10/15/57.

HEAVY CONSTRUCTION—LB & CA

▲ **NEW YORK**—State Dpt. P. Wks., State Office Bldg., Albany,

N. Y.—Gull Contg. Co., Inc., 33-15 Lawrence, Flushing 54, N. Y., CA **$10,509,380**, 8½ in. rein.-con. slab roadway 0.78 mi., c. conc. pavt. 0.07 mi., b. conc. 1.17 mi., c. conc. pavt. 0.56 mi., incid. structural steel via 57 span total 4,118 ft. welded girder and W.F. beam 4 sp. 406.5 ft. Int. Rte. connection 516 & 517 Bruckner-Expressway (Sect. 1-Contr. 3), Lafayette Ave.-Lowell St., Rte. 278 FIBE 60-1, Proj. I-287-1(48), Bronx Co. (Correction—contractor). Awarded July 27. CD 8/5, under CA.

N. Y.—C. D. Perry & Sons, Inc., foot of Monroe St., Troy, N. Y., CA **$971,733**, b. conc. 3.47 mi. prestressed conc. beam bridge span 47.2 ft. Granville-Troy Stage, SH 104, Granville connections, Rte. 22, FARC 60-98, FAS-60-5, Proj. F-523(8), Washington Co. CD 6/27, under LB.

▲ **NEW JERSEY**—New Jersey Turnpike Auth., Admin. Bldg., New Brunswick,

Whitmyer Brothers, R.D. 3, Hammonton, N. J., CA **$2,035,990**, galvanized guard rail median barrier 90 mi. along New Jersey Turnpike from Deepwater to Woodbridge, Contr. R70. Bids June 30. CD 7/7, under LB.

▲ **PENNSYLVANIA**—Pa. Hy. Dpt., 506 North Office Bldg., Harrisburg,

Latrobe Rd. Constr., Inc., Marcia St., P.O. Box 150, Latrobe, Pa., CA **$3,193,192**, 19,868 ft. divided rein.-con. hy., 6 bridges Interstate 70, L.R. 798 (2) A Sec. Erie-W. Va. Expressway, Buffalo, N. Franklin and S. Franklin Twps., Washington Co. Bids July 29, awarded Aug. 26. CD 8/5, under LB.

▲ **PENNSYLVANIA**—Pa. Hy. Dpt., 506 North Office Bldg., Harrison,

Ralph Myers Contg. Corp., P.O. Box 125, Pitcairn, Pa., CA **$4,859,034**, 9,898 ft. divided RCC hy., 6 bridges, Churchill Boro, Wilkins-Penn. Twps., Allegheny Co. Bids Aug. 5, awarded Aug. 29. CD 8/10, under LB.

▲ **PENNSYLVANIA**—Pa. Hys. Dept., 506 North Office Bldg., Harrisburg,

H. J. Williams, Inc., 150 S. Sumner, York, Pa., CA **$2,711,112**, Reading By-pass, Interstate Rte 180, from Green Hills Lake to west of Plowville, 4.47 mi., Berks Co. CD 8/24.

▲ **PENNSYLVANIA**—Pa. Hys. Dpt., 506 North Office Bldg., Harrisburg,

Adam Eidemiller, Inc., R.D. 4, Greensburg, Pa., CA **$2,221,142**, improvements on Rte. 51, from south of the county line, 4.87 mi. northerly, Westmoreland and Fayette Counties, Pa. CD 8/29.

▲ **Blount Bros. Constr. Co.**, 79 Commerce St., Montgomery, Ala., LB **$2,488,673**, (12 bidders), Washington Channel Bridge superstructure, WASH., D. C., D. C. Govt., Dpt. Hys., 499 Pennsylvania Ave. N. W., Wash. D. C. CD 7/27.

BUILDINGS—LB & CA

▲ **Glickman Corp.**, 565 5 Ave., New York, N. Y., Owner Builds, **$9,500,000**, 21 story Riverview MOTOR HOTEL, 5 story GARAGE, swimming pool, 12 Ave. W. 42 and W. 43 Sts., NEW YORK, N. Y. Former contract cancelled. CD 5/5, under CA.

▲ **Frouge Constr. Corp.**, 141 North Ave., Bridgeport, Conn., LB **$10,318,512**, (9 bidders), general contract, Combination, (A) Morrisania HOUSES Proj. NY 5-48A within portion E. 169 St., Washington Ave., E. 168 St. and Park Ave. and (B) Gouverneur Morris HOUSES, Proj. NY 5-37, Section I which includes Bldgs. 1 to 6 (inclusive) incl. Community Center, 7, 8, 9 and 10, and boiler room, E. 170 St., 3 Ave., E. 169 St. and Park Ave., Bronx Boro, NEW YORK, N. Y. New York City Housing Auth., 299 Broadway, New York 7, N. Y. Bids Aug. 23. CD 8/16;

Heating Maintenance Corp. of New York, 220 E. 138 St., New York 51, N. Y., LB **$1,229,000**, (3 bidders), heating and ventilating for Morrisania Houses and Gouverneur Morris Houses, Bronx Boro (New York, N. Y.);

Herman H. Schwartz, Inc., 97-11 Sutphin Blvd. Jamaica 35, N. Y., LB **$930,000**, (9 bidders), electrical work Morrisania Houses and Gouverneur Morris Houses, Bronx Boro (New York, N. Y.);

Paramount Plumbing & Heating Corp., 336 E. 92 St., New York 28, N. Y., LB **$1,407,800**, (9 bidders), plumbing Morrisania Houses and Gouverneur Morris Houses, Bronx Boro (New York, N. Y.);

Westinghouse Elec. Corp., 40 Wall St., New York 5, N. Y., LB **$924,811**, (6 bidders), elevators Morrisania Houses and Gouverneur Morris Houses, Bronx Boro (New York, N. Y.);

Lasher-Goldman Corp., 50 E. 42 St., New York 17, N. Y., LB **$1,693,000**, (9 bidders), general contract (A) Morrisania Houses Proj. NY 5-48, Bronx Boro, (New York, N. Y.).

Frouge Constr. Corp., 141 North Ave., Bridgeport, Conn., LB **$8,744,000**, (9 bidders), general contract (B) Gouverneur Morris Houses, Proj. NY 5-37, Section I, Bronx Boro (New York, N. Y.);

Heating Maintenance Corp. of New York, 220 E. 138 St., New York 51, N. Y., LB **$1,065,700**, (3 bidders), heating and ventilating Gouverneur Morris Houses, Bronx Boro (New York, N. Y.);

Herman H. Schwartz, Inc., 97-11 Sutphin Blvd., Jamaica 35, N. Y., LB **$800,000**, (9 bidders), electrical work Gouverneur Morris Houses Bronx Boro (New York, N. Y.);

Paramount Plumbing & Heating Corp., 336 E. 92 St., New York 28, N. Y., LB **$1,176,900**, (6 bidders), plumbing Gouverneur Morris Houses, Bronx Boro (New York, N. Y.);

Westinghouse Elec. Corp., 40 Wall St., New York 5, N. Y., LB **$769,692**, (6 bidders), elevators Gouverneur Morris Houses, Bronx Boro, (New York, N. Y.).

▲ **Sam Minskoff & Sons**, 521 5 Ave., New York 17, N. Y., Owner Builds, **$20,000,000**, 29 story, 515,000 sq. ft. OFFICE, 250 Broadway between Park Pl. and Murray St., facing City Hall Park, NEW YORK, N. Y. Emery Roth & Sons, 400 Park Ave., New York 22, N. Y., archts. CD 6/15.

▲† **Magnus International**, 1604 Walnut St., Phila., Pa., LB **$2,810,999**, (3 bidders), 200 unit Capehart HOUSING No. 2, ENG-30-075-61-1, FORT DIX, N. J. U. S. Eng., 111 E. 16 St., New York 3, N. Y. Kelly & Gurzen, 10 Columbus Circle, New York, N. Y., archts.-engrs. Bids Aug. 30. CD 8/2.

▲ **J. C. Breyfogle Co.**, Texas Ave. and U. S. 1, Trenton, N. J., CA Est. **$4,000,000**, SHOPPING CENTER and parking area, Lawrence Twp., TRENTON, N. J. Trenton Lanes Shopping Center, c/o Garfield Assocs., 24 Commerce St., Newark, N. J. Milosevich & Trautwein, 176 Graceland Blvd., Columbus, O., archts.-engrs. CD 11/30/53.

▲ **Stylecraft Builders**, 6730 Old York Rd., Phila., Pa., Separate Contracts, **$2,500,000**, RESIDENTIAL DEVELOPMENT (200), Dunks Ferry Rd., BENSALEM, PA.

▲ **John McShain, Inc.**, 17th and Spring Garden Sts., Phila., Pa., CA **$2,291,000**, general contract, COURT HOUSE and COURT HOUSE alterations, DOYLESTOWN, PA., Comrs. Bucks County, Doylestown, Pa. CD 8/16.

▲ **Michael Lubin**, Western Saving Fund Bldg., Phila., Pa., Separate Contracts, **$4,500,000**, RESIDENTIAL DEVELOPMENT, 300 homes, Meeting House Rd., etc., LINWOOD (BR. MARCUS HOOK), PA.

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $53,000; other public works $88,000; Industrial buildings $110,000; other buildings $400,000. Also Foreign projects of $1,000,000 and more in size of Interest to American contractors.

By Regions & Classes of Construction

(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED

New England — **Middle West**
Middle Atlantic — **West of Mississippi**
South — **Far West**

PROPOSED WORK

Water Supply — **Public Buildings**
Sewers, Waste Disposal — **Mass Housing**
Bridges — **Commercial Buildings**
Streets & Roads — **Industrial Buildings**
Earthwork, Waterways — **Unclassified**

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.
BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.
SOON LETS CONTRACT: SLC
LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.
CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.

CD dates shown are of Construction Daily Issue in which last previous report was published.
OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.

Symbols and Abbreviations Include:

† Federal Government
▲ Project of $1,000,000 or over.
ENR Engineering News-Record
CD Construction Daily

For additional reports see Construction Daily.

▲ **W. H. Ward Contractors,** 712 Gov. Ritchie Hy., Baltimore, Md., LB **$1,998,000,** (10 bidders), Woodlawn JUNIOR HIGH SCHOOL, Woodlawn, TOWSON, MD. Baltimore Co. Bd. Educ., Aigburth Rd., Towson 4, Md. CD 8/4.

SOUTH

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
September 15, 21 Louisiana September 23 Kentucky

▲ **Ala., Birmingham** — BA 9/20 — Industrial Water Works Bd., City Hall, industrial water system imprvs., one 60 m.g.d. raw water intake pumping station, one 60 m.g.d. booster pumping station, chemical house. $2,000,000. Plans deposit $50. Goodwin Engineers, 2111-7th Ave. S., engrs. CD 8/26.

HEAVY CONSTRUCTION—LB & CA

▲ **LOUISIANA**—State Dpt. Hys., Rm. 426, Headquarters Admin. Bldg., Baton Rouge,
W. R. Aldrich & Co., Box 1751, Baton Rouge, La., CA **$3,426,432,** West Pearl River bridges and approaches 3.463 mi. Rte. 1-59, SP 453-01-02, FAP 1-59-1(4)2, St. Tammany Parish. Bids July 27, awarded Aug. 10. CD 8/3, under LB.

BUILDINGS—LB & CA

▲ **Kirkman & Koury, Inc.,** 2103 Bessemer Ave., Greensboro, N. C., Owner Builds, **$20,000,000,** SHOPPING CENTER and RESIDENCES, GREENSBORO, N. C. CD 6/9.

▲ **Barge & Co.,** 250 Piedmont Ave. N.E., Atlanta, Ga., CA Est. **$2,000,000,** 14 story DOCTOR'S BLDG., ATLANTA, GA. Dr. John Mitchell, 302 Buckhead Ave. N.E., Atlanta, Ga.

▲† **D. & L. Constr. Co. & Assocs.,** 13238 Sherman Way, North Hollywood, Calif., CA **$3,665,000,** Capehart HOUSING, U. S. Naval Air Station, Glynco, NBy 29126, BRUNSWICK, GA. Dist. P. Wks. Office, Bldg. 13, U. S. Naval Base, Charleston, S. C. Bids July 7, CD 7/13, under LB.

▲† **Florida Builders, Inc.,** P.O. Box 11794, St. Petersburg, Fla., CA **$7,979,000,** CAPEHART HOUSING units for Key West Naval Station and Naval Air Station, NBy CH 29105, KEY WEST, FLA. Dist P. Wks. Office, 6th Naval Dist., Bldg. 13, U. S. Naval Base, Charleston, S. C. CD 8/11, under LB.

▲ **Basker Bldg. Corp.,** P. O. Box 2730, Ocean View Branch, Miami Beach, Fla., CA Est. **$3,000,000,** SPORTS RECREATION CENTER, 110,000 sq. ft., incl. bowling alley, restaurant, MIAMI, FLA. Florida Professional Bowling League, 946 Arthur Godfrey Rd., Miami Beach, Fla.

▲ **Robert L. Turchin, Inc.,** 1835 Purdy Ave., Miami Beach, Fla., CA **$3,716,469,** 148-unit Executive House APARTMENTS, MIAMI BEACH, FLA. 5255 Collins Ave. Corp., 420 Lincoln Rd., Miami Beach, Fla. Bids Aug. 12. CD 8/22, under LB.

▲ **Wiggs & Maale,** P.O. Box 2154, Palm Beach, Fla., CA Est. **$3,500,000,** 20,000 sq. ft. ELECTRONIC MFG. PLANT, PALM BEACH, FLA. Radio Corp. of America, Front and Cooper Sts., Camden, N. J.

▲ **R. E. Carlson, Inc.,** 1930 13th Ave. N., St. Petersburg, Fla., CA Approx. **$3,000,000,** 193 units, Pasadena Plaza COOP APARTMENT, ST. PETERSBURG, FLA. Pasadena Plaza Cooperative Apartment Co., c/o Broleman & Rapp, archts., 1216 E. Colonial Dr., Orlando, Fla. Cole Engr. Corp., 4146 Central Ave., St. Petersburg, Fla., engrs. CD 5/2.

▲ **Mills & Jones,** 400 23rd St. South, St. Petersburg, Fla., CA Est. **$10,000,000,** 2nd unit Bartow PLANT, Weedon Island, ST. PETERSBURG, FLA. Florida Power Corp., 101 5th St. South, St. Petersburg, Fla. Black & Veach, 1500 Meadow Lake Pky., Kansas City 14, Mo., archts. CD 12/3.

▲ **W. H. Cooper Constr. Co.,** P.O. Box 3537, University Station, Gainesville, Fla., CA **$2,421,000,** STATE OFFICE, Florida State Capitol Center, TALLAHASSEE, FLA. Bd. Comrs. State Institutions, 2nd Floor Center Wing, State Capitol, Tallahassee, Fla. Bids Aug. 4, awarded Aug. 23. CD 8/12, under LB.

▲ **Blaw-Knox Co.,** 330 6th Ave., Pittsburgh, Pa., CA Total est. **$13,000,000,** chlorine and caustic soda PLANT, CHARLESTON, TENN. Olin Mathieson Chemical Corp., 460 Park Ave., New York 22, N. Y. CD 8/31.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
September 13 Illinois
STREETS AND ROADS
September 3 Illinois, Ohio

HEAVY CONSTRUCTION—LB & CA

▲ **OHIO**—State Hy. Dpt., State Depts. Bldg., Columbus, Zone 15, Bids opened 8/23,
O.—**V. N. Holderman & Sons Co.,** 890 Oakland Park Ave., Columbus, O., LB **$868,547,** est. $1,182,000, (7 bidders), Type T 35 on B 70 and structures 0.481 mi. SR 3-16.69 I-70-6(4)98 (City of Columbus) Proj. 616, Franklin Co.;

O.—**The DeSalvo Constr. Co., Inc.,** 3701 Red Bank Rd., Cincinnati, O., LB **$2,629,000,** est. $3,381,800, (14 bidders), Type T 71, structures 4.535 mi. USR 52-2.52, I 74-1(4) 02, Proj. 618, Hamilton Co.;

O.—**Engle Constr. Co. and Standard Asphalt & Tar Co.,** P.O. Box 5, McArthur, O., LB **$1,014,964,** est. $1,312,700, (9 bidders), Type T 35 on B 20, structure 5.534 mi. SR 76 (4.62-4.66) S 181(7) Proj. 619, Washington Co. CD 8/1.

▲† **Chaney & James Constr. Co.,** Box 1363, Dallas, Tex. CA **$5,698,684,** SONIC Aircraft fatigue test laboratory, Wright-Patterson Air Force Base, DAYTON, O. U.S. Eng., Box 59, Louisville 1, Ky. Bids Aug. 10. CD 8/12, under LB.

▲ **ILLINOIS**—Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldgs., Springfield,

Ill.—**Michael Pontarelli, Inc., & John C. Tully Co.,** 4248 N. Kilpatrick St., Chicago, Ill., CA **$4,608,731,** storm sewer 3.01 mi. South Expressway, Chicago, Cook Co.;

Ill.—**S. J. Groves & Son,** 1104 E. Reynolds St., Springfield, Ill., CA **$1,435,269,** earth grading, 2.42 mi. FAI 70 between Ill. 111 and Collinsville, Madison Co.;

Ill.—**Madison Constr. Co.,** Box 222, Edwardsville, Ill., CA **$535,824,** surf. 6.54 mi. FAS 776 from Marine to Grantfork, Madison Co.;

Ill.—**E. A. Meyer Constr. Co.,** Lake Bluff, Ill., CA **$513,951,** base course, 1.99 mi. Lewis Ave., Waukegan, Lake Co. Grand total $7,093,775. Bids Aug. 5, awarded Aug. 20. CD 8/10, under LB.

▲ **Dpt. Purchases,** City Hall, Chicago 2, Ill., cancelled bids to have been opened Aug. 31, No. 80.75-60-40, Incinerator, Southwest 39th and Rockwell Sts., CHICAGO, ILL. **$5,500,000.** CD 8/1.

▲ **Kil-Bar Electric Co.,** 2161 N. Clybourn Ave., Chicago, Ill., LB **$2,826,783,** (3 bidders), No. 80.64-60-3, street lighting, Group A, cables, poles, piping; LB **$122,560,** No. 80.64-60-3, street lighting Group B, poles, CHICAGO, ILL. Dpt. Purchases, City Hall, Chicago 2, Ill. Bids Aug. 23. CD 8/8.

▲ **MICHIGAN**—State Hy. Dpt., 732 Mason Bldg., Lansing, Zone 26,

Mich.—**Louis Garavaglia Constr.,** 24240 Mound Rd., Warren, Mich., CA **$4,019,345,** grading, drainage, concrete paving roadways and ramps 2.57 mi., incl. 4 vehicle bridges, 2 pedestrian bridges, four storm water pump houses and utility alterations from point just south of Ford Rd. north to Westfield Ave., Southfield Freeway, Detroit and Dearborn, Wayne Co.;

Mich.—**Denton Constr. Co.,** 20415 Mack Ave., Grosse Pointe, Woods, Mich., CA **$909,819,** grading, drainage, concrete paving 4.426 mi. James Couzzens and Northwestern Hy., Oakland Co.;

Mich.—**Pierson Constr. Co.,** 200 Eddy Bldg., Saginaw, Mich., CA **$977,092,** grading, drainage, c. conc. surf. 4.847 mi. Interstate Hy. 75, Crawford Co. Grand total $5,906,256. Bids Aug. 3, awarded Aug. 23. CD 8/9 under LB.

MISSISSIPPI TO ROCKIES

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
September 15 Kansas
STREETS AND ROADS
September 15 Colorado September 15, 22, 23 Kansas

▲† **Kansas**—BA 9/29—U. S. Eng., P.O. Box 61, Tulsa, Okla., First Stage, embankment and outlet works, Council Grove Dam, Grand (Neosho) River. ENG-34-066-61-7. $2,000,000. CD 8/26.

▲† **Arkansas** — BA On Or About 11/3 — U. S. Eng., P.O. Box 867, Little Rock, Beaver Reservoir and appurtenant works, on main stem of White River, Carroll County, approx. 8 mi. west of Eureka Springs, approx. 150 airline mi. northwest of Little Rock. CD 9/15/59.

BUILDINGS—BA

▲† **Okla., Bartlesville**—PHYSICAL SCIENCE, etc.—BA About 10/27—Bureau of Mines, c/o Dpt. Interior, Wash., D. C., physical science and engineering bldg., $2,000,000. Donald McCormick, 1645 E. 21ts St., Tulsa, archt. CD 2/10.

HEAVY CONSTRUCTION—LB & CA

▲† **Bushman Constr. Co.,** Schneider Bldg., St. Joseph, Mo., LB **$1,818,343,** Missouri River Basin Proj., Farwell unit, earthwork and structures for Sherman Feeder Canal, Station 24 plus 00 to Station 656 plus 48, Arcadia, Custer, Valley and Sherman Counties SP DC 5368, NEBRASKA. Bureau Reclamation, Dpt. Interior, St. Paul, Neb. Bids Aug. 25. CD 7/19.

▲ **TEXAS**—State Hy. Comn., Austin,
Austin Bridge Co., P. O. Box 1590, Dallas, Tex., CA **$3,285,081,** bridges, 0.604 mi., Hy I. H. 45, Proj. I 45-1(25), Harris Co. Bids Aug. 17, awarded Aug. 23. CD 8/22, under LB.

BUILDINGS—LB & CA

▲ **Brockway Glass Co.,** Brockway, Pa., Owner Builds, **$2,500,000.** (First Phase) GLASS PLANT near here, ROSEMOUNT, MINN. K. M. Clark Eng. Co., 2815 Wayzata Blvd., Minneapolis, Minn., engr.

▲ **Thad Dederick Constr. Co., Inc.,** Box 13067, Houston, Tex., CA **$2,703,858,** 5 story, bsmnt., 140 sq. ft. BANK-OFFICE, 2 level PARKING GARAGE, 5 drive-in windows, tunnel leading to main office, BEAUMONT, TEX. American National Bank, 470 Orleans St., Beaumont, Tex. CD 6/8.

▲ **Fish Engineering Corp.,** M & M bld., Houston, Tex., CA **$4,750,000,** design and construct OLEFIN PLANT, ODESSA, TEX. EL Paso Natural Gas Co., and Rexall Drug & Chemical Co., El Paso, Tex. (Jointly). CD 8/19.

▲ **Hudson Engineering Corp.,** 2711 Danville St., Houston, Tex., CA **$3,950,000,** design and construct GAS PLANT and EQUIPMENT REPAIR SHOP, Port Acres, near PORT ARTHUR, TEX. Meredith & Co. and Associates Co., Bank of Southwest Bldg., Houston, Tex. CD 8/30;
Owner Builds, gas lines in area, **$125,000.**

▲ **Fluor Corp.,** 2500 S. Atlantic Blvd., Los Angeles 2, Calif., CA Est. **$18,000,000,** 14,600 b/d ALKYLATION REFINERY UNIT, TEXAS CITY, TEX. American Oil Co., Texas City, Tex. CD 5/9.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
September 16 Arizona September 22 California
October 5 California

HEAVY CONSTRUCTION—LB & CA

▲† **Johnson Constr. Co.,** 1725 Chicago St., Salt Lake City, Utah, and **Diversified Builders,** 6855 East Rosecrone Blvd., Paramount, Calif., LB **$4,000,000,** (15 bidders), Minuteman Assembly operations plant to be nine bldgs. with total 60,000 sq. ft., heating plant, 6 mi. roadway and renovation of 57 existing bldgs. to comply with new minuteman operation for Air Force Base, HILL AIR FORCE BASE, UTAH. Boeing Aircraft Co., Air Force Plant No. 77, WS-133A, Hill Air Force Base, Utah. Leo A. Daily & Assoc., 607 Securities Bldg., Seattle 1, Wash., archts. Bids Aug. 25.

▲ **WASHINGTON**—State Hy. Comn., Dpt. Hys., Olympia, Bids opened 8/30,
United States Steel Corp., 2345 N. W. Nicolai St., Portland, Ore., LB **$2,962,524,** (3 bidders), superstructure of bridge over Columbia River, at Vantage-Superstructure, FAI 90-3(9)133, Kittitas and Grant Counties. CD 8/2.

▲ **WASHINGTON**—State Hy. Comn., Transportation Bldg., Olympia,
Yuba Erectors, Div. Yuba Consolidated Industries, Inc., ft. of 26 Richmond St., San Francisco, Calif., CA **$3,445,000,** strengthening, repair modifications, Hood Canal Bridge, Unit No. 1, Kitsap and Jefferson Counties, for the Washington Toll Bridge Authority, Bids Aug. 23, awarded Aug. 24. CD 8/25, under LB.

▲ **CALIFORNIA**—State Div. Hys., 120 S. Spring St., Los Angeles, Bids opened 8/25,
R. E. Hazard Constr. Co. & W. L. Maxwell, Box 3217, San Diego, Calif., LB **$5,219,340** (5 bidders), eight lane freeway, frontage roads, 15 bridges and retaining walls, XI-SD-2-SD, San Diego Co. CD 7/20.

▲ **Oakland Port Comn.,** Grove St. Pier, Oakland, Calif., rejected bids Aug. 15 main passenger terminal for Oakland International Airport, OAKLAND, CALIF. LB **$5,300,000,** CD 8/18, under LB.

BUILDINGS—LB & CA

▲ **Johnson, Drake & Piper, Inc.,** 4821 Tidewater Ave., Oakland, Calif., CA **$8,140,000,** 20 bldgs. California CONSERVATION CENTER, near Susanville, Lassen Co. State Dpt. Corrections, W. O. 4304GC-11, CALIFORNIA. State Div. Architecture, 1120 N St., Sacramento, Calif. Bids Aug. 23, awarded Aug. 24. CD 8/26, under LB.

▲ **Butler-Harbour Constr. Co.,** 9741 Lincoln Ave., Anaheim, Calif., CA **$2,074,000,** 127 DWELLINGS, Tract 3709, BUENA PARK, CALIF. Hurst Homes, Inc., 9741 Lincoln Ave., Anaheim, Calif.

▲ **Gust K. Newberg, Constr. Co.,** 600 S. Lafayette Park Pl., Los Angeles, Calif., CA **$5,927,000,** MUNICIPAL CONVENTION and EXHIBIT HALL, LONG BEACH, CALIF. City, City Hall, Long Beach, Calif. Bids Aug. 17. CD 8/23, under LB.

▲ **James I. Barnes Constr. Co.,** 1119 Montana Ave., Santa Monica, Calif., CA **$2,207,700,** est. $1,500,000, 4 story, rein.-con. Marion Davies CHILDREN'S CLINIC, LOS ANGELES, CALIF. University of California, 405 Hilgard Ave., Los Angeles, Calif. Bids July 19, awarded Aug. 19. CD 7/22, under LB.

▲ **Banning Gardens,** 16901 Western Ave., Gardena, Calif. Owner Builds, **$2,184,950,** 117 stucco DWELLINGS, Baypoint Ave., Deepwater Ave., Dolores, Proctor, Q. and Seagrove Sts., Tract 25425, SAN PEDRO, CALIF.

CANADA

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
September 21 Ontario

▲ Ont., Port Arthur—HARBOR IMPRVS.—BA 9/21—Dpt. P. Wks., Hunter Bldg., Ottawa, harbor imprvs., Port Arthur-Fort William Area, $3,730,000. Plans deposit $20. CD 3/8.

BUILDINGS—LB & CA

▲ **Bird Constr. Co., Ltd.**, 12525 127th Ave., Edmonton, Alta., LB $2,205,500, (9 bidders), steel, concrete, brick, COMPOSITE HIGH SCHOOL, JASPER PLACE, ALTA. West Jasper Place School Dist. No. 4679, Jasper Place, Alta. John McIntosh, Civic Block, Edmonton, Alta., archt.

▲ **E. G. M. Cape & Co., (1956) Ltd.**, 4898 Western Ave., Montreal, Que., CA Est. $7,000,000, 20 story, structural steel frame, granite facing, air-conditioned OFFICE, 3 story underground GARAGE, northeast corner Sherbrooke and Mountain Sts., MONTREAL, QUE. Standard Life Assurance Co., 1245 Sherbrooke St. W., Montreal, Que. Awarded Aug. 23. CD 7/14.

▲ **J. L. Guay Ltee**, 6900 Cote des Neiges Rd., Montreal, Que., LB $2,924,000 (24 bidders), 3 and 4 story NORMAL SCHOOL, THREE RIVERS, QUE. Dpt. Public Instruction, Parliament Bldgs., Quebec City, Que. Bids Aug. 22. CD 7/29.

AMERICANS ABROAD

HEAVY CONSTRUCTION—LB & CA

▲ **Kaiser Eng. Div. Henry J. Kaiser Co.**, 1924 Broadway, Oakland 44, Calif., U.S.A., **Hornibrook Proprietary Ltd.**, Brisbane, **Davis Contractors Proprietary Ltd.**, Sydney and **Fletcher Constr. Ltd.**, New Zealand, CA $5,132,000, rehabilitation 242 mi. track, 1st Section, Collinsville-Townsville-Mount Isa section, Northern R.R., AUSTRALIA. State of Queensland, Brisbane, Australia. CD 1/15.

PROPOSED PROJECTS

WATER SUPPLY

▲ **Ala., Birmingham**—Industrial Water Bd., City Hall, two pumping stations and chemical bldg. industrial water project, $2,000,000. Goodwin Engineers, 211-7th Ave. S., consult engrs.

▲ **Mass., Lowell**—City, P. Wks. Dpt., City Hall, water filtration plant on Merrimack River Bank. $2,200,000. Whitman & Howard, Inc., 89 Broad St., Boston, consult. engr. Constr. 1960-61.

▲ **Tex., Greenville**—City, City Hall, voted bonds Aug. 20. WW, main, etc. $2,889,000. CD 8/12.

SEWERS, WASTE DISPOSAL

▲ **D. C., Wash.**—Dpt. Sanitary Engineering, D. C. Govt. 499 Pennsylvania Ave. N. W.,
sanitary and combined sewer work in connection with Proj. "C" in vicinity of DC end of Theodore Roosevelt Bridge, $3,000,000 appropriated.
Potomac River Pumping Station, D. C. end of Theodore Roosevelt Bridge, over $2,000,000 appropriated.
relief of Potomac River pollution, Proj. "C", 14th St. to Rock Creek, N. W. $2,838,000 no appropriation.
S. W. sanitary interceptor sewer, Main Ave., N & O St S. W., $1,743,000 appropriated.
Potomac River force main, Project "C" $1,000,000 appropriated.
Upper Potomac Relief sewer, Rock Creek to District line Proj. "C" Over $1,000,000 appropriated.
storm sewers, Upshur St., N. E. 18th and Eastern Ave. $750,000 appropriated.
S. W. storm sewers, P St., Washington Channel East, converting from combined to separate sewers $500,000 appropriated.
storm sewer, Naylor Rd., S. E. between 30th and Southern Ave., $200,000 appropriated.
storm sewer, Livingston Rd., S. E. between 3rd and Atlantic, under $100,000 appropriated.
imprv. sewage treatment plant, $450,000 appropriated.
rehabilitation of east side interceptor sewer, gunlite lining, 1st and "O" St., S. E. to 21st & E. Capitol St., Over $200,000 appropriated.
storm water sewer at National Arboretum, "S" St., between 22nd and 24th Sts., N. E. $100,000 appropriated

▲ **Mass., Tewksbury**—Town Tewksbury, Bd. P. Wks., Town Hall, sewerage system and treatment plant. $2,510,000. Whitman & Howard, Inc., 89 Broad St., Boston, engr. CD 8/23. Constr. 1960-61

▲ **Mass., Westwood**—Town Westwood, Bd. Sewer Comrs., Town Hall, sewerage system. $3,000,000. Whitman & Howard, Inc., 89 Broad St., Boston, engr. Constr. 1961.

▲ **Mass., Whitman**—Town Whitman, Bd. P. Wks., Town Hall, sewerage system and treatment plant. $2,594,000. Whitman & Howard, Inc., 89 Broad St., Boston, engr. Constr. 1960. CD 8/23.

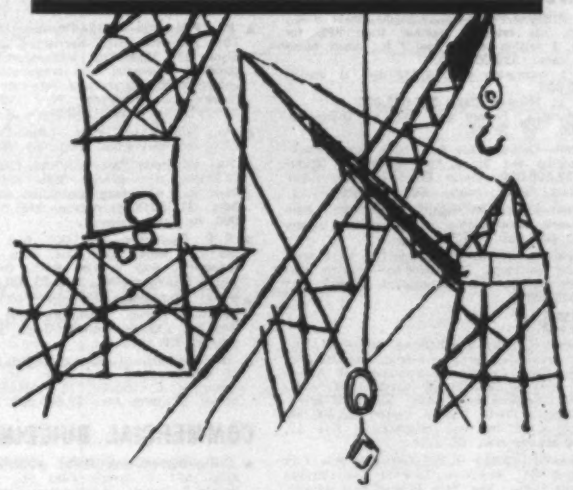
▲ **Mich., Mt. Clemens**—Macomb County Drain Comn., 115 Groesbeck Hy., Lorraine storm sewer drainage sys., City of Warren and Centerline, N.E. of 8 Mile Rd. $6,600,000. CD 2/27/44.

▲ **Pa., Trevoise**—Lower Southampton Twp., Bucks Co. Municipal Authority, sewerage collection system. $4,200,000.

STREETS AND ROADS

▲ **OHIO**—Dpt. Hys., State Depts. Bldg., Columbus, Zone 15,
Lucas Co.—2.75 mi. stretch relocated US 23, $3,300,000, Sanzenbacher, Miller & Brigham, 3023 Sylvania St., Toledo, consult. engrs. George Lieber,

VOLTA RIVER PROJECT:
APPLICATIONS TO TENDER



The Government of Ghana will shortly be inviting tenders for the Civil Engineering Works—dam and appurtenances, power house, etc.—of the Volta River hydro-electric project. To encourage prospective tenderers to study the project site closely the Government of Ghana is prepared to grant financial assistance of up to £G2,500 each to a limited number of approved contractors. Applications, received before the 22nd September 1960, will be entertained by the Principal Secretary, Volta River Project Secretariat, P.O. Box M. 77, Accra, Ghana. Applicants should give detailed particulars of all comparable works executed by them, the strength of their directing staff, their financial standing, man-power resources at their command, and other relevant information. The grant of financial assistance will be made at the time a duly completed tender is received from the applicant and taken into consideration. Tenders will be expected to include, in addition to all the usual tender documents, a detailed construction plan and statements of the nature and value of construction equipment which is proposed to be imported and of numbers by grades and categories of expatriate technical personnel proposed to be employed. The successful tenderer will not be eligible to receive the financial assistance mentioned in this advertisement. It is not the intention of the Government that tendering for the project should be restricted to contractors approved for the grant of financial assistance only—the invitation to tender will be an open one.

Dist. II Engr., Bowling Green, owners' engr. Bids about Nov. 8. CD 11/21/57.

▲ **Pa., Phila.**—Dpt. Procurement, City Hall Annex, overpass and approaches, Harvey St., etc. $2,500,000. Gannett Fleming Corddry & Carpenter, Inc., 5823 Penna Ave., Pittsburgh, consult. engrs. CD 3/3/47.

▲ **Tex., Orange**—Orange County, Courthouse, voted bonds Aug. 13, county-wide road imprvs., paving, bridges, $5,245,503; industrial road constr., $250,000.

▲ **Va., Lynchburg**—City, City Hall, streets, $2,125,000; Distribution Hy., Rte. 29-Rte. 297, $231,250; Distribution Hy., Kemper St., $200,000; Industrial Hy. Development, $680,500.

EARTHWORK, WATERWAYS

▲ **Alabama**—Alabama Power Co., Alabama Power Bldg., Birmingham, has received approval from FPC for Project No. 2 raising Jordan Dam 7 ft., power house and 5 mi. canal, $33,000,000.
Project No. 1 increasing to 119,000 kw. at Jordan Dam, $740,000.
137,000 kw. at Mitchell Dam, $10,000,000.
Dam at Wetumpka, Elmore Co., will be abandoned, $14,000,000. CD 10/23.

▲ **Fla., Miami**—Comrs. Dade Co., 10th Floor, Courthouse, dredging and filling Port of Miami (Dodge Island). $2,000,000. Twin Engineering Co., 504 DuPont Plaza Center, engrs. CD 8/20/59.

▲ **Tex., Kermit**—Southland Royalty Aldwell Co., Kermit, earthwork, waterflooding unitization for recovery 19,000,000 bbls. oil. $2,500,000.

▲ **Tex., Rankin**—Humble Oil & Refining Co., 1216 Main St., Houston, earthwork, waterflooding injection, unitization, 29,000,000 bbls. anticipated, Midkiff field unit. $4,000,000.

AIRPORTS

▲† **Fla., Cocoa**—SATURN LAUNCHING COMPLEX, etc.—National Aeronautics & Space Admin., Atlantic Missile Range, Cape Canaveral, completion of Saturn Launching Complex, $2,250,000 appropriated; engineering and laboratory bldg. addn., $300,000 appropriated; Mercury World Control Center, $2,000,000 appropriated; Launching Pad modification, Pad 12, $4,000,000 appropriated. CD 2/10.

▲ **N. Y., Idlewild**—CARGO BLDGS.—Port of New York Auth., 111 8 Ave., New York, Zone 11, two 125,000 sq. ft. cargo bldgs., New York International Airport. $2,864,000.

▲ **N. Y., Idlewild**—TERMINAL—Port of New York Authority, 111 Eighth Ave., New York, Zone 11, plans by I. M. Pei, 385 Madison Ave., New York, N. Y., terminal for various Airlines, New York International Airport. $9,000,000.

UNCLASSIFIED

▲ **Ill., Springfield**—ACTIVITIES BLDG.—Dpt. P. Wks., State of Illinois, Capitol Bldg. women's activities bldg., State Fair Grounds, $2,000,000. CD 2/7/55.

▲ **N. J., Secaucus**—HARNESS RACING TRACK—Racing Asso. & Metropolitan Racing Assoc. Corp., 102 Ocean Ave., Deal, N. J., harness racing track near Rte. 3 and Paterson Plank Rd. Over $7,000,000.

▲ **Tex., Austin**—HYDRO-ELECTRIC POWER PLANT, etc.—City, City Hall, voted bonds Aug. 6, hydro-electric power plant, $18,800,000; imprv. power plant units, $1,000,000; No. 1, electric sub-station, $750,000; No. 2, electric sub-station, $650,000; No. 3, electric sub-station, $800,000. CD 8/12.

PUBLIC BUILDINGS

▲ **Calif., Fremont**—SCHOOL—Washington Union High School, 415 S. Main St., plans by Falk & Booth, 16 Beale St., San Francisco, 140,000 sq. ft. Newark High School, Newark. $2,784,977. CD 10/19/56.

▲ **Calif., LaJolla**—CLASSROOMS, etc.—University of California at La Jolla, Science & Engineering School, plans by Risley & Gould, 2502 West Third St., Los Angeles, two 7 story, 150,000 sq. ft. rein.-con. classrooms, and heating plant, $4,263,000; 2 and 3 story, bsmnt. laboratories. $4,000,000. CD 5/13 under Unclassified.

▲† **Fla., Bay Pines**—HOSPITAL—Veteran's Admin., Munitions Bldg., Wash., D. C., 650 bed hospital, $15,000,000 (planning appropriation).

▲ **Fla., Tampa**—COURTHOUSE and JAIL—Hillsborough Co., County Bldg., jail and courthouse, addns., $2,365,000, or jail and courthouse, $4,000,000. CD 1/7/49.

▲† **Iowa, Des Moines**—HOSPITAL—Veterans Admin., Munitions Bldg., Wash. 25, D. C., Phase II, alterations Hospital bldgs. 1 and 4, electrical distr. system, $3,000,000. CD 2/18.

▲ **Md., Baltimore**—POLYTECHNIC INSTITUTE—Bd. Educ., 3 E. 25 St., Zone 18, plans by Sandless & Craycroft, 2421 Maryland Ave., Zone 18, Polytechnic Institute, Falls Rd. north of Cold Spring Lane. $3,400,000.

▲ **Md., Baltimore**—SCHOOL—Bd. Educ., 3 E. 25 St., Zone 18, Western high school, Falls Rd. north of Cold Spring Lane. $3,300,000.

▲ **Miss., Jackson**—DORMITORIES etc.—State Bldg. Comn., State Office Bldg., plans by Frank Rice, 1202½ N. State St. and T. N. Touchstone, Jr., 1714 N. Mill St., and E. L. Malvaney, Millsaps Bldg., research wing at University Medical Center, $3,000,000; plans by Overstreet, Ware & Ware, 414 S. State St., girls dormitory at Jackson State College, $480,000; plans by J. T. Liddle, 3100 Old Canton Rd., boys dormitory at Jackson State College, $480,000. Eugne Drummond, Magruder Bldg. staff engr. CD 8/8.

▲ **Mo., Columbia**—POWER PLANT ADDN.—City, City Hall, $4,800,000 bond election Nov. 8, municipal power plant addn. incl. 22,000 KW generator and accessories, 220,000 lb. boiler and accessories, coal bunkers addn., electric power interchange, dist. warehouse and dist sys. extension. Lutz & May, 819 Finance Bldg., Kansas City, Mo., consult. engrs. CD 6/7.

▲ **Pa., Indiana**—SCHOOL—Indiana Jt. School Dist., plans by Heidrich & Risheberger, State College, high school, $2,300,000. CD 9/23/59.

▲ **Pa., Phila.**—RESEARCH & INSTRUCTION—General State Authority, 18th and Herr Sts., Harrisburg, plans by Paul Monaghan, Jr., 1528 Walnut St., veterinary research and instruction bldg., for University of Penn., Proj. 1102-2, $2,000,000. CD 8/16.

▲ **Pa., Pittsburgh**—LIBRARY—General State Authority, 18th and Herr Sts., Harrisburg, plans by Celli & Flynn, 335 Shaw Ave., McKeesport, and Kuhn, Newcomer & Valentour, 470 Washington Rd., Zone 28, undergraduate library and reference library unit for University of Pittsburgh, Proj. 1103-3, $6,350,000. CD 2/16/56, under Commercial Buildings.

▲ **Pa., Trafford** — SCHOOL — Penn-Trafford Jt. School Dist., secondary school, Proj. 763. $2,400,000.

▲ **Pa., University Park**—JOURNALISM and COMMUNICATIONS, etc.—General State Authority, 18th and Herr Sts., Harrisburg, journalism and communications bldg., $1,200,000; education bldg., Unit 3, $2,000,000, Pa. State University.

▲ **S. C., Charleston**—HOUSING—Dist. Public Works Office, Dpt. Navy, Naval Base, plans by Reid Hearn & Associates, 600 Beltline Blvd., Columbia, NBy CH 31575 housing project. Over $5,000,000. CD 7/26.

▲† **Va., Kecoughtan**—CHRONIC PATIENTS BLDG.—Veteran's Admin., Munitions Bldg., Wash., D. C., 200 bed, Chronic Patients Bldg., $2,700,000 appropriated. CD 3/13/56.

▲ **Newfoundland**—St. John's—TRADE SCHOOL—Province of Newfoundland, Dpt. Educ., St. John's plans by Cummings & Campbell, 70 Portugal Cove Rd., trade school, Elizabeth Ave. $3,000,000. CD 7/18.

COMMERCIAL BUILDINGS

▲ **Calif., Burbank**—HOSPITAL ADDN.—St. Joseph Hospital, 501 S. Buena Vista St., plans by Welton Becket & Assocs., archts.-engrs., 10000 Santa Monica Blvd., Los Angeles, Zone 25, 6 story hospital addn., chapel and glass enclosed six level bridge to present hospital. $4,000,000.

▲ **Calif., San Francisco**—APARTMENT—Barton-Western Assocs., c/o Skidmore, Owings & Merrill, archts., 1 Montgomery St., 169 unit apartment, Western Development area. $2,000,000.

▲ **Calif., San Francisco**—APARTMENT—Gough-O'Farrell Community Housing, Inc., c/o Donald Powers Smith, archt., 133 Kearny St., 17 story, 100 unit circular apartment, Western Development area. $2,000,000.

▲ **Calif., San Francisco**—APARTMENTS—International Longshoremen's & Warehousemen's Union, 255 9 St., plans by Marquis & Stoller, 737 Beach St., 300 unit frame apartments, Western Development area. $6,000,000.

▲ **Conn., Bloomfield**—OFFICE—Emhart Mfg. Co., 333 Homestead Ave., Hartford, 200,000 sq. ft. office, Cottage Grove Rd. $2,000,000.

▲ **Conn., Union City**—SHOPPING CENTER—Albert DiStasio, et als, Beacon Falls, shopping center, Union City Rd. $2,500,000.

▲ **Fla., Hollywood**—HOSPITAL—Owner, c/o Francis R. Hoffman, archt., 407 Lincoln Rd., Miami Beach, 100 bed hospital. $2,000,000.

▲ **Fla., St. Petersburg** — APARTMENTS — Sidney Colen Constr. Co., 5501 58th Ave. N., 2 story, concrete, steel framing, 593 unit Clearview Co-op Apartments, 38th Ave. and 59th St. N. $6,000,000.

▲ **Ga., Atlanta** — MOTOR HOTEL — Atlanta American Motor Hotel, 950 W. Peachtree St. N.W., plans by Melvin Grossman, 420 Lincoln Rd., Miami Beach, motor hotel. $3,000,000.

▲ **Hawaii, Kahaluu**—APARTMENT, etc.—Jerome Campbell (Kaaawu, Oahu), Homer Campbell, 1621 Ala Wai Blvd., Honolulu, plans by Albin E. Kubala, 430 Ilimano, Honolulu, 84 unit cooperative Coral Lagoon apartments, marina with 48 yacht and boat slips, pool, mall, landscaped lawn area, boardwalk, parking facilities, $2,500,000. Robert W. Anderson, 5072 Maunalani Circle, Honolulu, consult. engr.

▲ **Hawaii, Waikiki** — HOTEL — Thomas Morrissey, 166 Oahu Ave., Honolulu, plans by Frank Lloyd Wright Foundation, c/o William Wesley Peters, West Paliesin Assn., Phoenix, Ariz., 300-400 room apartment hotel, $5,000,000-$6,000,000.

▲ **Mich., Benton Harbor**—DEPARTMENT STORE—Goldblatt Bros., 333 S. State St., Chicago, Zone 4, Ill., 1 story, 86,000 sq. ft. Fairplain Shopping Center. $3,000,000.

▲ **Mo., Hamilton** — HOMES — General Home Builders, West Elkton Rd., 275 homes, W. Elkton Rd., $3,850,000. Constr. in Fall.

▲ **Mo., Kirkwood (St. Louis 22 P.O.)** — HOUSING — Marco Builders, Inc., 1 Marco Dr., Kirkwood, Zone 22, 150 units housing development, south of Kirkwood Park and west of Geyer Rd. $2,500,000.

▲ **Mo., St. Louis County**—SHOPPING CENTER—Louis L. and Milton L. Zorensky, c/o 2100 S. Warson Rd., Ladue 24, Mo., 1,450 x 2,000 ft. regional shopping center, incl. two department stores, related facilities, several high fashion shops, stores, 73 acre, S.E. corner Lindbergh Blvd. and St. Charles Rock Rd. Over $3,000,000.

▲ **N. J., Point Pleasant**—MOTEL, etc.—Philip Comora, 883 Red Oaks Dr., Elberon, 50 unit Gull Island Motel, boatel, marina, beach and pool, shops, convention hall. $3,000,000-$5,000,000.

▲ **N. Y., New York**—APARTMENT, etc.—Kips Bay Towers, Inc., 501 5th Ave., Zone 17, plans by S. J. Kessler & Son, archts.-engrs., 551 5th Ave., Zone 16, 20 story apartment and garage, 235-45 E. 29th St. $2,400,000.

▲ **N. Y., New York**—APARTMENTS—York Hill Housing, Inc., 331 E. 70th St., plans by Brown & Guenther, 1860 Broadway, Zone 23, 20 story apartment and garage, 1532-50 York Ave. $2,695,000.

▲ **N. C., Charlotte**—SHOPPING CENTER—Ervin Constr. Co., 3400 Rozzelle Ferry Rd., plans by R. Mesrobian, 502 Liberty Life Bldg., 115,000 sq. ft. family Fair Village Shopping Center, $2,500,000.

▲ **O., Akron**—DEPARTMENT STORE, etc.—Edw. J. DeBartolo & Assoc., 2620 Market St., Youngstown, 130,000 sq. ft. department store, Waterloo Rd. and S. Arlington St., $2,000,000; warehouse, south of Emmitt and Waterloo Rds., east of Mohegan Dr., $800,000. Montgomery Ward & Co., lessee. Constr. in fall.

▲ **O., Cuyahoga Falls**—DEPARTMENT STORE—Edw. J. DeBartolo & Assoc., 2620 Market St., Youngstown, 130,000 sq. ft. department store, State Rd., near Graham Rd. $2,000,000. Montgomery Ward & Co., lessee. Constr. soon.

▲ **O., Mayfield Heights**—HOMES—Midwest Builders, 2199 S. Green Rd., Cleveland, Zone 21, plans by Marvin Rukin, 13947 Cedar Rd., Cleveland, Zone 18, 160 addnl. homes, site of Mayfield Heights Golf Course. $3,200,000. Constr. late Fall. CD 4/15/59.

▲ **O., Northfield**—HOMES—Louis Molnar, 30504 Winston Dr., Cleveland, Zone 40, 120 homes, Northfield Center. $3,000,000.

▲ **O., Shaker Heights**—APARTMENT—Owner, c/o Zehman, Wolfe & Sherman, 13484 Cedar Rd., Cleveland, Zone 18, plans by Weinberg & Teare, Citizens Bldg., Cleveland, Zone 14, 50 suite luxury apartment, 16901 Van Aken Blvd. $2,000,000. Constr. soon.

▲ **Pa., Phila.**—MOTOR HOTEL, etc.—J. J. Rubin, c/o Curtis & Davis, archts., 331 Madison Ave., New York, N. Y., 210 unit motor hotel, parking area and swimming pool, Presidential Blvd. and City Line Ave. $2,000,000. Hotel Corp of America, 883 6th Ave., New York, N. Y., lessee. Thalheimer & Weiss, 1315 Walnut St., New York, N. Y., consult. archts.

▲ **S. C., Greenville** — SHOPPING CENTER — Greengate Shopping Center, c/o Toombs, Amisano & Wells, archts., 70 Fairlie St. N.W., Atlanta, Ga., shopping center, $5,000,000.

▲ **Tex., Dallas**—APARTMENT—Owner, c/o Hudson & Hudson, archts., Mercantile Bank Bldg., plans by Kelley & Marshall, Kenedy Bldg., Tulsa, Okla., 10 story, 90 unit, 120,000 sq. ft., masonry luxury apartment, swimming pool, underground parking, Gilbert and Turtle Creek. $2,750,000.

▲ **Tex., Houston**—BANK OFFICE—Fannin State Bank, 1020 Holcombe Blvd., plans by Lloyd & Morgan, 4605 Montrose Blvd., 14 story, 200,000 sq. ft., air-conditioned, masonry bank-office. $3,500,000.

▲ **Sask., Regina**—HOSPITAL—The Grey Nuns' Hospital, Dewdney, Regina, hospital expansion. $2,025,000.

INDUSTRIAL BUILDINGS

▲ **Ill., Chicago**—PLANT—Marquette Cement Mfg. Co., 20 N. Wacker Dr., Zone 6, 2,250,000 bbl. annual cap. cement producing plant, Calumet River and 100th St. $10,000,000.

▲ **Iowa, Fort Madison**—PLANT—California Spray-Chemical Corp., Lucas St. and Ortho Way, Richmond, Calif., chemical fertilizer plant. $22,000,000. (Correction—owner's address). CD 7/28.

▲ **Ky., Louisville**—SHOPS EXTENSIONS—Louisville & Nashville R.R. Co., J. B. Clark, ch. engr., 9th and Broadway, South Louisville Shops 13 and 14 extensions, Floyd St., incl. car dismantling plant, Park Blvd. $15,000,000.

▲ **N. J., Trenton**—INDUSTRIAL PARK—Jack Ellis, 1118 Glenview St., Phila., Pa., industrial park extension of Whitehead Rd. and Ewingville Rd., $2,000,000. Thomas T. Moore, 8 Wakefield Dr., consult. engr.

▲ **O., Haverhill**—PLANT—Dow Chemical Co., Midland, Mich., styrofoam plant addn., $4,000,000.

▲ **Tex., Houston**—HYDEAL UNIT, etc.—Signal Oil & Gas Co., Jacinto Bld., Hydeal unit, converting toulene into benzine, on Houston Ship channel, $2,500,000; catalytic cracking refinery, $1,500,000; steel tank storage, reinforced concrete foundations, on Houston Ship Channel, $300,000.

▲ **Wis., Milwaukee** — SERVICE CENTER — Milwaukee Gas Light Co., 626 E. Wisconsin Ave., plans by Fritz von Grossmann, 5455 W. Burleigh St., 1 story, 410 x 444 ft., rein.-con service center, north side. $3,582,000.

LATIN AMERICA

▲ **PANAMA**—Republic of Panama, Panama City, 187 mi. road constr. Peninsula de Azuero and in Provinces of Veraguas, Cocle and Chiriqui. $14,500,000. World Bank Loan—$7,200,000.

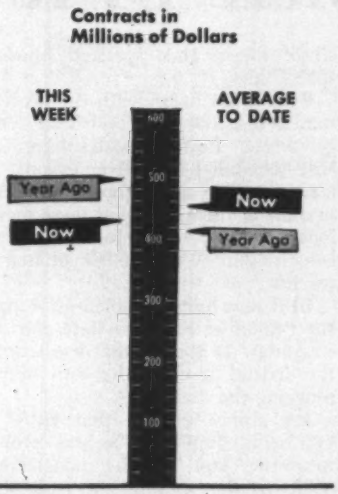
FOREIGN

▲ **Tunisia, Tunis**—AIRPORT—Govt. Tunisia, Tunis, airport 3 mi. north of here. $5,100,000.

(Proposal Advertisements 83 to 85)

Construction Scoreboard

This Week . . .



AMOUNT OF CONTRACTS LET

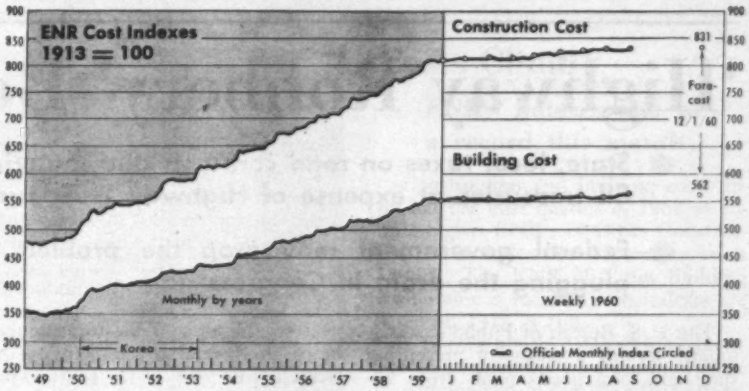
Contracts Awarded In 50 States By Type	This‡ Week	Cum. 36 wks 1960	Chge '59-'60
	millions		%
All Heavy Construction	$427.2	$16,257.0	+10
By Ownership			
PRIVATE	243.6	8,792.1	+20
PUBLIC	183.6	7,464.9	0
State & Municipal	121.2	5,715.6	+ 8
Federal	62.4	1,749.3	−19
By Type of Work			
PUBLIC			
Waterworks	4.3	321.4	+ 7
Sewerage	5.7	408.3	−13
Bridges*	5.7	570.6	+33
Highways	67.0	2,337.6	+ 6
Earthwork, Dams & Waterways	26.6	574.3	−13
Buildings:			
Excl. Housing	42.6	1,703.7	−10
Housing	14.3	490.2	0
Unclassified	17.7	1,061.7	+ 3
PRIVATE			
Buildings:			
Mass Housing	103.0	4,364.3	+34
Commercial	72.3	1,760.1	+10
Industrial	58.7	2,028.8	− 3
Unclassified	9.3	636.0	+73

* Includes Private bridges. ‡4 Day Week.

NOTE: Minimum size projects included are: Waterworks and waterways, $53,000; other public works, $88,000; industrial buildings, $110,000 other buildings, $400,000.

NEW CONSTRUCTION CAPITAL

	Week of Sept. 1	Cum. 35 wks 1960	Chge '59-'60
	millions		%
Corporate Securities	$126.0	$2,082.4	−20
State and Municipal:			
All Except Housing	147.0	4,643.0	+8
Housing	....	185.5	+147
Federal Loans	4.6	120.6	+27
Federal Aid	....	1,717.8	−5
Total Nonfederal	$277.6	$9,749.4	−2
Federal Appropriations:			
Projects in U.S.	$1,239.0	$2,556.1	+504
Outside U. S.	....	157.8	+3846
Total New Capital	$1,516.5	$12,463.2	+20



ENR INDEXES (1913=100), 20-cities' average	Week of Sept. 1 1960	% Change from July 28 1960	% Change from Sept. 3 1959
Construction Cost	830.92*	+0.08	+2.3
Building Cost	562.59*	+ 0.2	+1.2

* Official Monthly Index for September, 1960.

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850.
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518.

This Month . . .

WAGE RATES, 20-cities' average	Sept. 1960	% Change from Aug. 1960	% Change from Sept. 1959
Common	$2.739	+0.2	+4.4
Skilled (average 3 trades)	4.087	+0.6	+4.2
Bricklayers	4.307	+0.1	+3.5
Structural Ironworkers	4.13	+1.3	+4.4
Carpenters	3.824	+0.4	+4.7
Equipment operators (average three types)	3.712	+0.5	+4.4
MATERIAL PRICES, 20-cities' average			
Structural Steel (average 3 mills), per cwt	5.50	0	0
Lumber, 2x4 Fir, per M fbm	118.04	−0.4	−6.7
Lumber, 2x4 Pine, per M fbm	109.40	+0.03	−1.3
Cement, bulk, per bbl	4.02	+0.2	+1.6
Sand, per ton	2.362	0	−4.3
Ready-mixed concrete, per cu yd	14.30	0	+2.1
Gypsum sheathing, ½"x2'x8', per Msf*	62.55	−0.2	−0.2
Fiber board sheathing, ½" sq. ed., per Msf*	70.91	−1.5	−3.2
Mineral wool insulation, 3' batts, per Msf*	68.03	0	−0.7
Crushed stone, 1½", per ton, CL	2.646	+1.2	−1.8
Concrete blocks, sand/gravel, 8"x8"x16", each*	0.2284	−0.9	−8.5

Latest Month . . .

	Aug. 1960	July 1960	Aug. 1959
Brick, common per M	41.02	+0.3	+3.6
Lime, hydrated finishing, per ton, CL	38.78	+0.3	+0.2
Structural clay tile, 3x12x12", per M, 2,000 up*	188.20	0	+2.5
Vitrified clay sewer pipe, std 12", per ft	1.404	−2.2	+2.7
Concrete sewer pipe, 12", per ft	1.419	0	+6.0

* Delivered, trucklots

ENR INDEX REVIEW

	Construction Cost		Building Cost		Volume	
1959	1913=100	1949=100	1913=100	1949=100	1913=100	1949=100
Aug	810.35	169.93	554.31	157.60	509	147
Sept	811.76	170.18	555.88	158.01	545	158
Oct	810.60	169.94	555.40	157.88	415	120
Nov	808.98	169.60	554.19	157.53	509	147
Dec	807.85	169.36	552.30	157.10	436	126
1959 Average	**796.91**	**167.07**	**547.82**	**155.72**	**540**	**156**
1960						
Jan	811.84	170.20	554.40	157.57	432	125
Feb	812.73	170.38	555.43	157.92	486	140
Mar	813.26	170.49	555.16	157.81	533	154
Apr	814.78	170.81	555.98R	157.83	695R	201
May	822.58	172.45	562.59R	158.52	610R	176R
June	826.64	173.30	561.02R	159.16	784R	227
July	829.33	173.86	561.47	159.60	683	197
Aug	830.18	174.04	561.21	159.53	632	183
Sept	830.92	174.20	562.59	159.92	...	...

R: Revised due to retroactive wage increases

'Highway Robbery' Bothers BPR

- **State, local taxes on road contracts and materials fill treasuries at expense of Highway Trust Fund.**
- **Federal government may drop the problem of plugging the drain in Congress' lap.**

The U.S. Bureau of Public Roads is quietly seeking a means of preventing state and local governments from filling their general fund coffers at the expense of the Interstate and ABC federally aided highway systems.

The government guess is that over the life of the Interstate program, as much as $600 million in Interstate aid funds will never result in actual road mileage. Figuring in aid funds for the ABC systems would increase the loss to construction.

The drain on highway-value-received comes from the multitude of state and local taxes that are levied either directly on highway contracts, on roadbuilding materials and equipment, or on contractors themselves, just because they are in the business of construction. The trend of state and local governments is to new taxes or fatter rates for existing taxes as administrators at all levels cast about for ways to pay for existing or added community services. New or higher rates would raise the federal government's bill without a proportionate increase in highways put-in-place.

Right now 15 states levy taxes directly on highway construction contracts. Some are a per cent of the value of the contract, some are based on contractors' gross business volume, others levy sliding-scale fees on the dollar value of the contract, or a flat fee for each employee of a contractor.

Thirty-one states have some form of materials, inventory or equipment tax. And seven of these 31 also levy a tax or a fee on the actual construction contract.

But adding to the total tax bill that contractors must pay are those taxes levied by city, county or special-district governments. Put them all together and they add up to a fat chunk of money that contractors have to figure into their bid prices.

If, for example, a contractor is operating in a state or a locality where a sales tax is in force, he must include in his bid, the amount of the tax on materials he will use. That amount will be turned over to the taxing body when he receives payment for work completed. But in the case of an Interstate contract, the federal government will have actually paid 90% of the contract price, which also includes taxes. If the sales tax was a local one, the local government made money on a highway benefit paid for largely by the BPR. And if the sales tax was a state levy, the state government gets back a portion of its 10% contribution to the construction contract.

Some of the tax schedules are on the heavy side. West Virginia last year boosted its gross business volume tax on contractors from 2% to 2.6% (ENR April 23, 1959, p. 98). This means that for every $100 of highway contract received by a construction company, it will return $2.60 to the state government. In effect, the state's $10 share of that $100 contract has been cut to $7.40.

In South Carolina a contractor must figure into his bid a large and diverse bundle of taxes, which will swell state and local government coffers at the expense of BPR. Here's the tax package:

- A 3% state sales and use tax on materials and equipment.
- County and city ad valorem taxes on the value of contracts or materials and equipment.
- A certificate fee of $60.
- An annual license fee of $100 on contracts of $12,500 or more.
- An income tax and a $50 filing fee on corporations not chartered in the state.

And although the tax payments may be mailed to the collector by the contractor, it is truly the BPR that pays the price.

Five states are now considering enactment of legislation that would place new taxes specifically on the contractor, the construction contract, or both.

Montana offers an example of this type of tax with a target. The administration is considering placing a special tax on fuels used by construction equipment. In the over-all picture, it would raise the price of construction with the federal government paying 90% of the increase while the state, paying only 10% of the contractor's bill, would get all of the revenue received from the special levy.

BPR is not happy with the tax situation as it stands now; and things could get worse. Forty-six states have regularly scheduled legislative sessions, and taxation will be at the top of the dockets in most of them; many of these may be looking at the contractor and highway construction as rich source of new tax revenue.

BPR may have a problem in stopping the run-off of funds to state and local treasuries. It appears that legislation at the federal level is the only way of plugging the drain.

It's almost certain that BPR will eventually drop the local-tax problem into the laps of the congressmen. Whether the Senators and Representatives will take aim at the practice is something else again. Congressmen probably would be loath to cut into the political and economic systems of their constituent governments. Looking the other way could be considered the better part of valor.

Legal Actions Entangle $250-Million Rail Project

Construction of a $250-million railroad through 700 miles of British Columbian wilderness is bogged down in a legal morass. The railroad is part of a project sponsored by Axel Wenner-Gren, Swedish financer, to exploit the power, mineral and timber potentials of the region.

A token start to meet legal obligations was made recently, but no contract for clearing of right-of-way has been awarded. However, clearing of a planned 95-acre marshalling yard has started along with a precise location survey.

A construction start may be some distance away. Early next month there will be a hearing to determine whether the new railroad, the Pacific Northern Railway, comes under the laws administered by the Public Utilities Commission or requirements established by the Provincial Railway Act. Main issue is whether the latter supercedes the PUC Act.

The company made a token construction start without PUC permission. Although the agency itself has not complained, the city of Prince Rupert is opposed to the rail company's plans and has filed a court action.

Business in Brief . . .

• **School building ballot**—Los Angeles voters will act on school bond proposals totaling $153 million at the November election. The bonds would pay for facilities to accommodate estimated annual enrollment increases of 30,000 pupils through 1963.

• **More steel for the South**—Florida Steel Corp., Tampa, will build a $3.3-million steel plant near Charlotte, N. C. It will produce reinforcing bars. Capacity will be 51,000 tons annually.

• **Hotel for Houston**—A 10-story hotel will be constructed in Houston for the Hotel Corporation of America. Completion is scheduled for 1962. Welton Becket & Associates, Los Angeles, is architect.

• **Big construction buyer**—The North Pacific Division, Corps of Engineers, will let construction contracts valued at $45 million in the fiscal year ending next June 30. Largest of 38 major projects is a $10-million rail and highway relocation job in connection with construction of John Day Dam on the Columbia River.

• **More money, or else**—Highway construction in Pennsylvania will be cut next year unless the legislature provides more money by boosting either the gasoline tax or car license fees, the highway department says.

• **New industrial plant**—Olin Mathieson Chemical Corp. will construct a $13-million plant near Charleston, Tenn. A starting date is not yet set.

State's Road Plan Trips on Deficit

North Carolina's highway department is recommending a 15-year highway construction program that would cost $505 million more than the department's revenue structure will permit.

To provide what the department considers "essential," the state would have to spend $2.4 billion between this year and 1975. But gasoline taxes in that period will yield only $1.9 billion, leaving an average deficit of $33.6 million a year. This year, state road income will fall short by $31 million.

The plan given to the highway commissioners by Highway Director W. F. Babcock is the result of a three-year study by the highway department's advanced planning unit. It includes only road projects considered "rational, and needed and imperative for the future progress of North Carolina . . ."

The program calls for converting several hundred miles of the state's primary roads to four-lane routes by 1975, constructing bypasses around most medium size and large communities, and virtual completion of Interstate routes.

Although the report does not specifically advocate an increase in the gasoline tax, it does urge that state highway fund money now spent to support other state agencies be returned to the road-building fund.

Currently the State Prisons System, Paroles Department, Probation Commission, and the Motor Vehicles Department siphon off more than $14 million a year from the highway fund. This year, the six-cent-per-gallon gas tax is expected to provide about $85 million for highway purposes.

But even if gas tax revenues that now are spent for non-highway purposes were returned to the highway department, a one-cent per gallon tax increase would also be required to eliminate the estimated deficit.

North Carolina has 10.5% of all state-administered road mileage in the nation and operates on only 3.05% of the state funds of all highway departments.

The highway commission has responsibility for all secondary roads. In most states these roads are administered and financed by the counties through county property taxes or gasoline tax refunds. North Carolina, the report said, also has a larger responsibility than most states for urban streets, with some one-third of all such mileage on the state maintained system.

For various reasons, the report said, North Carolina is investing up to 25% less money in its highways than the average of other states, and "this investment deficiency will be felt to a much larger degree during the next 15 years as the impact of the motor vehicle, . . . places a greatly increased strain on our highway and street systems."

Costs Climb

ENR's indexes rise to a record this month

Construction and building costs approach the final quarter of 1960 at all-time highs. ENR's 20-Cities Construction Cost Index for September is at 830.92. The ENR 20-Cities Building Cost Index is 562.59. Both indexes are based on 1913 as 100.

A 10-cent hourly deferred wage boost effective September 1 for common labor in Birmingham is the lever that jacked the Construction Cost Index.

Deferred increases for three trades in three cities also are responsible for the climb in the Building Cost Index. The increases are 10 cents hourly for structural ironworkers in Atlanta, 10 cents for bricklayers in Birmingham, eight cents for carpenters in Birmingham and five cents for carpenters in Minneapolis.

In August, structural ironworkers received a deferred wage increase of 22½ cents an hour in Los Angeles and San Francisco. New contracts raised carpenters' wages 10 cents an hour in Dallas and structural ironworkers' rates 15 cents in Pittsburgh.

The Construction Cost Index tops the August value by 0.08% and is 2.3% above September 1959. The Building Cost Index is 0.2% above August and 1.2% above September 1959.

September will not bring much action on the wage front. An increase for structural ironworkers in Philadelphia probably will come out of the current new-contract negotiations there. But construction workers in the other ENR 20-cities now are covered by contracts. In Denver, ironworkers will get a five-cent hourly deferred wage boost.

Bargain prices for fir lumber currently are harder to obtain. Demand at Northwest mills, as measured by ENR's Lumber Demand Indicator, is holding at a steady rate, while the huge inventories that kept the lid on prices in the spring have been pared slightly.

Prices of Douglas fir 2x4s, fob mill, are $2 to $3 above last month. Most local yards have not passed this increase along to contractors. While yards in two cities raised price tags on fir lumber, dealers in four other cities trimmed them because of stiff competition. Fir lumber prices this month generally should be steady to a little higher.

Southern pine 2x4 prices should continue steady after rising .03% since the beginning of August. Fears of a price jump due to higher labor costs died when Congress' efforts to boost minimum wages collapsed last week.

Eight-Month Contract Total at Record

Heavy construction contract awards in August totaled $1.9 billion, close to a record for the month. The only bigger August came in 1952 when atomic power projects in the South gave the market a temporary lift.

Last month's total soared 24% above August 1959. And the cumulative total of $15.2 billion that went into contractors' new-business books in the first eight months is 10% above the same period last year. It's a new high for the period.

Award of the long-delayed Chesapeake Bay Bridge-Tunnel project (ENR Aug. 1, p. 15), and a start on several long term, multimillion-dollar housing developments gave August a big boost.

Industrial building contract awards marked time last month, but the buildup of proposed future plant construction suggests an upturn is not too far off.

Private contract awards of $965 million established a record for the month, pushing 24% ahead of one year ago, despite a seasonal dip from the two preceding months. The $8.2 billion scored in the first eight months is 20% above 1959's same period. The cumulative total is the second largest volume of private work, exceeded only by 1956, the big industrial building year.

Public contracts of $894 million also topped one year ago by 24%, chiefly on the strength of state and municipal work, which climbed 34% above August 1959. Federal construction continues to lag behind last year.

For the first eight months, total public work is only 1% short of one year ago, a 21% lag in federal contracts being offset by an 8% gain in state and municipal construction awards.

Private housing activity countered the usual midsummer lull by scoring a 22% rise over July and rocketing 80% ahead of one year ago. Standing out in August were the large number of long-term housing development ventures that are programmed for as far as 20 years in the future. Particularly significant was the $1 billion, 20-year project by Sunset International Petroleum Corp. This project was given a $10-million start for this year.

Other large housing developments initiated last month included a $50-million project in New York State, a $30-million, five-year program in Hawaii, and a $35-million, two year undertaking in Maryland.

The award of the $118.6-million Chesapeake Bay Bridge-Tunnel project last month bolstered public bridges and unclassified work. It also lifted over-all construction awards in the South to an all-time August high and the second highest month on record.

Capehart and municipal public housing awards stepped up their pace in August, narrowing the gap in the eight month period to 4% from the 22% fall-off registered in the first seven months.

Highway construction contracts failed to gain as much momentum as had been expected from the U.S. Bureau of Public Roads' invitation to states to double up awards in the first quarter of the current federal fiscal year.

Kentucky Adds 32 Miles To Its Toll Highway Plans

Kentucky's plans for 163 miles of toll roads were expanded last week by another 32 miles.

Original plans called for 120-mile toll road southwest from Elizabethtown to Princetown and a 43-mile route between Campton and Winchester (ENR July 21, p. 27). The longer of the two would be an extension of the existing Kentucky Turnpike from Louisville. This project will cost an estimated $70 million.

The shorter highway now will extend a distance of 75 miles to Salversville, instead of terminating at Campton. A $50-million to $60-million bond issue for this route already is authorized.

Engineering design and plans for the 75-mile toll road will be done by the state highway department. Bright Engineering Co. of Frankfort, Ky., is the general consultant for the 120-mile project.

Engineering Construction Contracts for August

Thousands of Dollars (000) omitted

	August, 1960								U. S. Cumulative			
	New England	Middle Atlantic	South	Mid-West	Mississippi to Rockies	Far West*	Total U. S.	% Change '59 to '60	1960 (34 weeks)	1959 (35 weeks)	% Change '59 to '60 (av wk)	Canada August 1960
Public Works, Total	80,842	109,386	290,295	89,656	180,670	163,305	894,034	+24	7,644,567	7,316,504	− 1	45,106
Waterworks	583	2,482	5,865	4,590	8,543	3,517	25,580	− 6	313,481	297,139	+ 9	1,722
Sewerage	3,844	5,523	6,579	4,752	9,611	5,469	35,778	−30	391,555	450,752	−12	2,777
Bridges	150	5,070	53,977	7,744	4,612	13,567	85,120	+27	538,536	414,798	+34	1,219
Earthwork, waterways	217	458	13,675	580	13,152	32,477	60,539	−23	536,268	655,474	−15	235
Streets and roads	6,836	39,213	44,758	39,081	66,076	54,476	250,392	+22	2,169,279	2,144,912	+ 4	14,675
Buildings: Residential	27,526	23,586	12,907	7,569	22,786	361	94,735	+1195	453,712	484,389	− 4	878
Other	19,408	21,411	55,511	18,053	40,321	40,340	195,544	+ 9	1,696,573	1,907,513	−11	10,851
Unclassified	2,278	11,623	97,023	7,357	15,009	12,996	146,346	+39	1,036,064	1,009,557	+ 6	12,549
State & Municipal	35,937	104,949	234,624	85,826	135,138	129,499	725,973	+34	5,390,939	5,160,210	+ 8	28,082
Federal	24,905	4,417	55,671	3,830	45,532	33,706	168,061	− 7	1,653,628	2,150,294	−21	16,424
Private, Total	54,026	330,069	171,433	92,816	220,807	95,598	964,683	+24	8,181,210	6,996,913	+20	50,836
Bridges			1,187				1,187	+1249	2,686	7,756	−64	
Buildings: Industrial	14,664	28,506	53,267	51,908	64,909	4,795	218,109	− 9	1,894,425	1,898,127	− 2	17,317
Mass housing	26,447	272,623	48,119	27,644	105,572	67,171	547,576	+80	4,167,713	3,153,987	+36	5,927
Other	12,536	27,914	29,204	12,396	40,745	21,551	144,346	−21	1,597,364	1,575,544	+ 4	16,092
Unclassified	379	900	39,656	868	9,681	2,081	53,445	+ 2	609,632	362,599	+73	11,500
Total, Aug., 1960—4 weeks*	114,843	439,369	461,728	182,472	401,477	258,903	1,858,717	+24				96,942
Total, July, 1960—4 weeks*	131,116	405,971	400,986	252,591	463,113	351,310	2,005,087					137,428
Total, Aug., 1959—4 weeks*	95,113	271,320	275,809	241,445	331,975	185,963	1,401,624					187,730
Eight Months—1960 (34 wks)*	914,960	2,580,104	2,410,705	2,247,282	3,399,591	2,673,126			15,225,777		+10	1,263,902
Eight Months—1959 (35 wks)*	808,886	3,002,104	2,423,001	2,510,681	2,933,596	2,471,249				15,209,517		1,094,397
% Change '59 to '60 (Av wk)	+8	+19	+2	−8	+10	+11						+27

*Includes Alaska & Hawaii contracts

Courts Restrict New Labor Law

- **One rules that informational picketing is not legalized by the right to advertise a dispute.**
- **Another denies the right to strike in contract negotiations for a broad subcontractor clause.**

In the slow evolution of what the Landrum-Griffin labor law means and how it works, it looks as if labor has received less than some of its members bargained for in the amendments to the Taft-Hartley Act. This is particularly true of those provisions employers originally called "concessions" to labor.

Two new construction cases at the federal district court level indicate:

- A union still has no right to advertise a dispute, even if no work stoppage results, if its activity amounts to picketing and has the earmarks of a secondary boycott.
- And the construction industry's hot cargo exemption is not broad enough to include a subcontractor clause that affects suppliers as well as subcontractors.

Both decisions, however, raise as many questions as they answer because the courts did not attempt to explain their reasoning.

The informational picketing case came out of a Long Island, N. Y. jurisdictional dispute between metal lathers and carpenters.

A firm that manufactures reinforced concrete structural elements had assigned the work, including the handling and cutting of reinforcing bars, to its own employees, who are represented by a certified local of the carpenters union.

The lathers, who claimed that the work is normally done by lathers, tried to get it and failed. They then posted two to five pickets at the entrance of the private road to the plant, cutting off deliveries of concrete batches when the drivers refused to cross the picket line.

Clearly indicating that the picketing was for informational purposes, the picket signs read: "Notice to General Public. Picketing for Informational Purposes Only." The signs then went on to state that workers doing lathers' work were receiving less than lathers' wages and were breaking down the lathers' wages, hours and working conditions.

The union contended that it was merely advertising its dispute. A Landrum-Griffin exception to the secondary boycott ban allows "publicity, other than picketing, for the purpose of truthfully advising the public" of a labor dispute as long as a work stoppage by neutral employees does not result.

The court concluded that the object of the union's activity was to force a work assignment in its favor, which is illegal. And it found that the union activity was directed at employees of neutral employers, creating an illegal secondary boycott.

In issuing an injunction against all picketing, whether during or after working hours, the court specifically ruled that the publicity proviso of the law does not legalize after-hours informational picketing, even if no secondary employees can be affected by it.

"I have been cited to no case before the board or the courts construing this particular proviso," the court said, "but on analysis of its language, the statutory scheme and the legislative history of the Act, as amended, I am satisfied that Congress intended to prohibit all picketing for the objects declared unlawful" in the secondary boycott provisions relating to jurisdictional disputes.

The result is in line with congressional thinking. Sen. John Kennedy (D., Mass.) has said, for example, that the proviso frees a union "to conduct informational activity short of picketing." Types of permissible activities, he explained, are handbills, newspaper advertisements and radio announcements.

In the other case, the Building and Construction Trades Council of Monroe, La., had struck construction projects of four contractors in an effort to force the contractors to negotiate a labor contract that contained a subcontractor clause.

The clause the council wanted was this: "The contractor shall not sublet, subcontract or assign any of the work which comes under the jurisdiction of the council or its member local unions to any persons, firm or corporation unless such person, firm or corporation agrees in writing to abide by the master agreement and the craft agreement covering such work. This article shall apply only to that work subcontracted, sublet or assigned directly by the contractor to such person, firm or corporation, and shall not apply to work subcontracted, sublet or assigned by such person, firm or corporation to another person, firm or corporation."

The court ordered the council to halt the strike. The agreement the council sought was illegal, the court said, and the strike to get it was unlawful.

The Landrum-Griffin law, the court explained, outlaws hot cargo contracts and forbids a union and an employer from making an agreement requiring the employer to cease doing business with another person. The law expressly makes a strike to get such an agreement an unfair practice and illegal.

The construction industry's hot cargo exemption was not discussed. Under that exemption, an agreement between a union and a contractor relating to the subcontracting of on-site work is legal. The court, however, did find that the struck contractors regularly deal with a number of suppliers in the area as well as subcontractors, leaving the inference that the clause was not limited to on-site work and could affect them too. And the court also seemed to be troubled by the fact that the clause might control work assignments—a situation not covered by the exemption.

Although the decision is enigmatic in some respects, this much is clear: The clause the council wanted is not the kind the law permits.

Western Plumbers Settle For a One-Year Contract

Plumbers and pipefitters, who have been earning $3.89 an hour in Washington and northern Idaho, will receive wage and benefit increases totaling 27 cents an hour under a new one-year labor agreement.

Their wages will be increased 25 cents an hour on January 1; hourly health and welfare contribution will be increased from 10 to 11 cents on September 1; and employers will contribute 18 instead of 17 cents an hour to employee accounts in a bank-type plan for vacation purposes.

A modification in the hiring hall provisions qualifies the right of employers to reject applicants referred by the union. Rejection can be made only at the job site and applicants who are rejected must receive two hours' pay plus travel pay one way to the job.

Situs Picketing Bill Isn't Dead Yet

Recent stalemate points up the problem of legislative draftsmanship and construction industry definitions

Time played into the hands of the opponents of the construction industry's situs picketing bill during the last session of the 86th Congress, just as the bill's opponents hoped it would. But the complex and controversial issue is still very much alive; the showdown is just postponed.

Where does the issue stand? Where does it go from here?

Sen. John F. Kennedy, the bill's most active sponsor, promised last week to renew next year the fight that has been waged around the bill for the last six years. And it is a foregone conclusion that the bill will remain a ranking legislative goal of the AFL-CIO building trades unions and that it will again run into the vehement opposition of many leading employer associations.

The problem that lies ahead for the strategists on both sides is getting a clearer understanding of what the bill is and what it intends to do. Essentially, this is a question of legislative draftsmanship. The issue itself is simple. The difficulty, enhanced by the nature of the construction industry, is that of definition. It is similar to the problem that now exists in trying to apply the Davis-Bacon Act to missile base work.

Some have claimed, for example, that the effects of the bill are not limited to the construction industry or to the specific project on which a labor dispute arises.

One of the latest to voice this fear is Aerospace Industries Association, a 117-member trade association of aircraft and missile contractors. It says "our defense effort could be seriously undermined" if the bill were passed because a "handful" of workers could shut down any of our gigantic defense installations.

Similar fears have been expressed by the Chamber of Commerce, National Association of Manufacturers, Associated General Contractors and other employer groups. They also claim the bill would legalize product boycotts, victimize manufacturers, promote blackmail picketing, restore the closed shop and legalize jurisdictional strikes.

Purpose of the bill is not to legalize all construction industry secondary boycotts but to nullify a 1951 Supreme Court decision (the Denver Building Trades case) holding unions guilty of a secondary boycott under present law when, in a legitimate dispute with one of several contractors on the same job, they foment strikes against the neutral contractors and shut down the entire project. A typical situation is the picketing of a multiple-contractor project to force a nonunion contractor off the job. The union theory is that his presence on a union job undermines union wages and working conditions. The bill purports to exempt this kind of activity from the boycott ban.

President Eisenhower, early in his Administration, became sympathetic to the union position. His rationalization was that the interests of contractors and subcontractors on the same job are so interrelated as to deny any of them the status of neutrality, which is the basis of the law's protection against boycotts.

He endorsed the proposal in 1954, 1958 and 1959. Labor Secretary James P. Mitchell has consistently supported it. The bills before Congress in the last session contained the exact language of the Administration Reform Bill, written by the Labor Department and introduced in the Senate in 1959 by conservative Sen. Barry Goldwater (R., Ariz.).

The bills provided that the law should not be interpreted to ban a work stoppage or strike "at the site" against any one of several employers "in the construction industry," provided (1) the employers are members of a joint venture or in the relationship of contractors and subcontractors; (2) there exists at the site a labor dispute over wages, hours and working conditions of workers at the site; and (3) the dispute is not unlawful under other sections of the law.

Numerous hearings have been held on the proposal over the last six years. It was approved by the Senate Labor Committee in 1954, the House Labor Committee in 1959 and the House Labor Committee in 1960. This summer, the House bill has been bottled up in the Rules Committee. The Senate bill was amended by the Senate Labor Committee to ban product boycotts, but no further action was taken.

As the debate goes on in preparation for next year's session of Congress, there is still great disagreement as to what the bill would do. Despite its long legislative history, it is still called a "Pandora's box" by some.

In the absence of an overwhelming election victory for organized labor, it looks as if that label will continue to stymie the bill until more reassuring and articulate answers are found to the questions raised by the bill.

Labor in Brief . . .

• **Kohler strike**—Winding up its hearings on the nation's longest current strike, the National Labor Relations Board has ruled that Kohler Co., a Wisconsin plumbing fixture firm, refused to bargain in good faith with the United Auto Workers Union and converted an economic strike into an unfair labor practice strike. It ordered Kohler to reinstate 1,700 workers discharged in 1954 and to bargain on request with the UAW.

• **Tough for the 5.94%**—A drop in unemployment has automatically cut off for the next three months new claims to extended unemployment benefits in California. Under the state's law, benefits in addition to the regular 26 weeks are allowed when the state unemployment level exceeds 6% of the average work force. The average fell during the last quarter to 5.94%.

• **Jurisdictional dispute**—A jurisdictional dispute between iron workers and carpenters over installation of sealer plates in steel gates last week idled 250 men working on the Markland Dam, downstream from Cincinnati on the Ohio River. The dispute was expected to be referred to the National Joint Board for the Settlement of Jurisdictional Disputes.

• **The right to contract out**—Another example of union efforts to limit management's right to farm out work occured in the bargaining dispute that last week shut down the Pennsylvania Railroad. Although not affecting construction contractors, the original demand of nonoperating employees (exclusive of maintenance of way workers) was broad enough to bar the purchase of rolling stock from outside concerns.

Two portable air compressors with multi-drill rigs speed drilling for 30-inch gas line stretching from Texas to California.

World's Largest Rotary Compressors Ram a Pipeline Through the Desert!

Burying a pipeline from Texas to the West Coast calls for a tremendous ditching job — much of it in tough, rocky desert terrain. On the Arizona stretch, the contractor, H. C. Price Co., chose the most powerful equipment available to punch through the pipeline as quickly and economically as possible.

Two Le Roi 1200 Rotaries — the largest portable compressors made — are each teamed up with a crawler-mounted Le Roi 4-drill rig to do blast-hole drilling. Each rig simultaneously drills four 2¼-inch blast holes to a depth of six to eight feet, depending on terrain formation. The 1200 portable compressor and 4-drill rig combination saved time and manpower.

The Le Roi 1200 Rotary delivers a full 1200 cfm of free air at 100 psi — enough power to meet your biggest demands. The compact powerhouse has an 18 foot turning radius, and meets all existing state highway regulations.

It's also the most flexible compressor on the market. Twin-unit design gives you two 600 cfm compressors that you can operate together for 1200 cfm or separately for 600 cfm of air. You can shut one unit off when air demand falls below 600 cfm, or for servicing without disrupting work. When air requirements are below 600 cfm, you can alternate use of units to equalize compressor life. What's more, interchangeable engine and compressor parts simplify servicing and protect you against costly emergency shutdowns in the field.

Ask your local Le Roi distributor for more information. Or write directly to Le Roi Division, Westinghouse Air Brake Co., Milwaukee 1, Wisconsin.

PC-611

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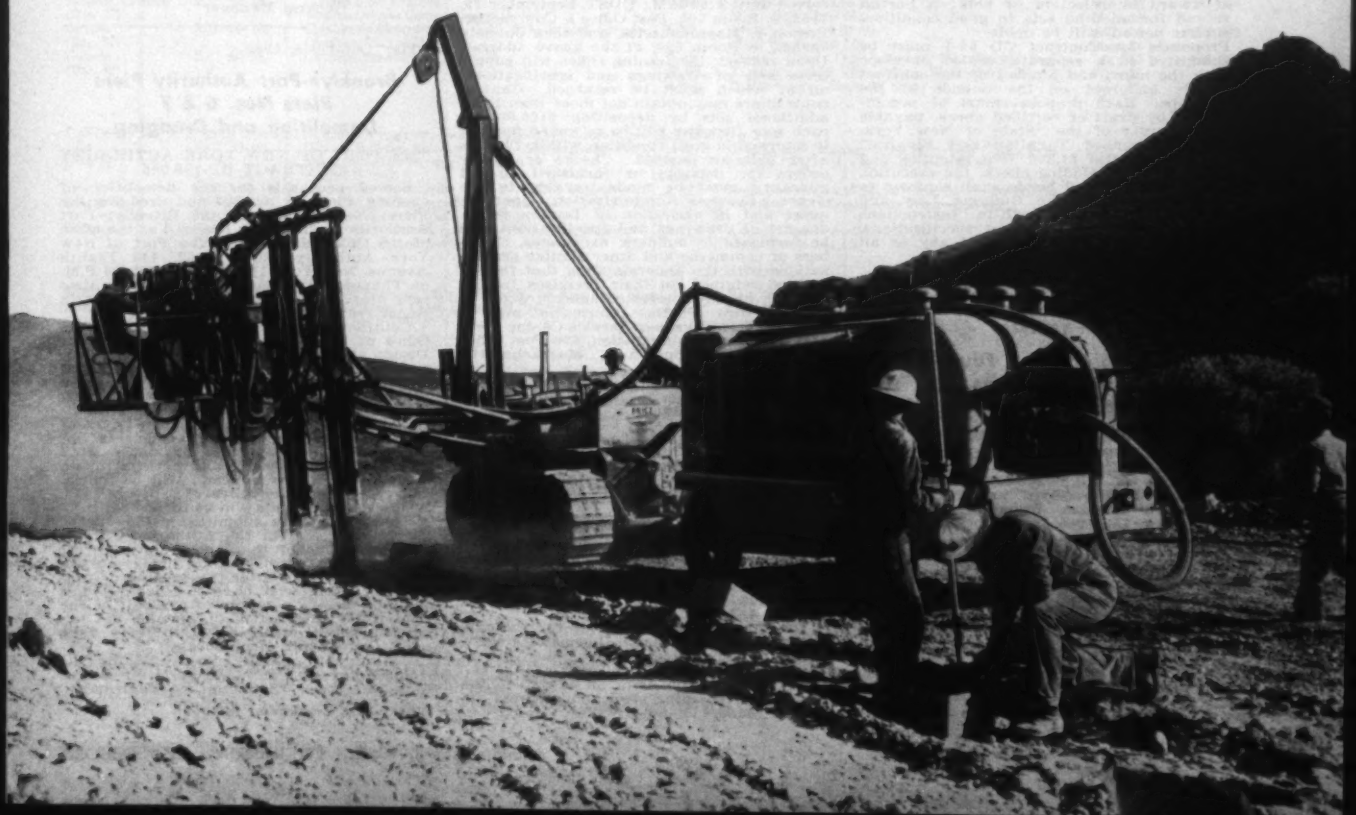

OFFICIAL PROPOSALS

RATE: The rate for Official Proposal advertising is $2.40 per line or fraction set solid. Where the advertisement is set other than solid, the space is measured by total space occupied and charged on basis of 12 lines to the inch.

CLOSING DATE: Friday 10:30 A.M. for issue dated the following Thursday.

SEND COPY TO: Official Proposal Division, Engineering News-Record Class. Adv. Div., P. O. Box 12, N. Y. 36, N. Y.

Bids: September 21, 1960

Channel Improvements Contract CD 60-1

NOTICE TO BIDDERS

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Building Law and Highway Law, sealed proposals will be received, until 10:30 A.M., D.S.T., on September 21, 1960 by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Gov. Alfred E. Smith State Office Building, Albany, New York for:

Contract CD 60-1 for
Channel Improvements, Deepening Chadakoin River (Chautauqua Lake Outlet)
City of Jamestown, Chautauqua County, New York

Engineer's Estimate for CD 60-1 is $25,000. Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts, 12th Floor The Gov. Alfred E. Smith State Office Bldg., Albany, New York.
(b) Department of Public Works, 270 Broadway, New York City, New York.
(c) In addition to the above mentioned offices, plans, maps and specifications for Contract CD 60-1 may be examined and obtained at the office of Mr. E. G. H. Youngmann, District Engineer, 65 Court Street, Buffalo 2, New York.

The deposit for Plans and Proposal Forms for Contract CD 60-1 is $10.00. A refund in full will be made to bidders for return of one set in good condition within 30 days of award or rejection of bids; a partial refund for all othe sets in good condition, similar period, will be made.

Proposals for Contract CD 60-1 must be submitted in a separate, sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Commissioner of Taxation and Finance" in the amount of $1,300. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Building Law and Highway Law as set forth in "Instructions to Bidders" in the contract specifications. The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPERINTENDENT OF PUBLIC WORKS

Bids: September 15, 1960

Soil Explorations & Foundation Investigations Contract Spec. No. SM-170

NOTICE TO CONTRACTORS

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of Highway Law, sealed proposals will be received until 10:30 a.m., Advanced Eastern Standard Time, on September 15, 1960, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y. for:

SOIL EXPLORATIONS AND FOUNDATIONS AT VARIOUS SITES ON SPRAIN PARKWAY, JACKSON AVENUE TO BRADHURST AVENUE, WESTCHESTER COUNTY, WHICH CONSTITUTES CONTRACT SPEC. NO. SM-170.

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany 1, New York.
(b) Mr. Kurt G. Rauer, District Engineer, New York State Department of Public Works, Pleasant Valley Road, Poughkeepsie, New York.
(c) Mr. William Mende, Principal Building Construction Engineer, Department of Public Works, 270 Broadway, New York City.

The deposit for a set of plans, specifications and proposal forms is $5.00. Refunds of deposits for plans, specifications and proposals will be made *only* in case the deposits of individual sets are $10.00 or more, per Chapter 835, Laws of 1960.

The Engineer's Estimate of cost for this work is $12,350.00.

Proposal for this contract must be submitted in separate sealed envelope with the name of the contract plainly endorsed on the outside of the envelope. Proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum of $1,000.00. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law as set forth in "Instruction to Bidders".

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPERINTENDENT OF PUBLIC WORKS

General Services Administration, Public Buildings Service, Boston 9, Massachusetts, August 25, 1960—Sealed bids for construction of U. S. Courthouse and Federal Office Building, Hartford, Connecticut, will be received until 3:00 P.M., EDST, September 29, 1960, in Room 600, Post Office & Courthouse, Boston 9, Massachusetts, and then publicly opened in Room 600, at the above address. Upon request, the Issuing Office will supply three sets of drawings and specifications, all of which must be returned. General contractors may obtain not more than three additional sets by depositing $125.00 for each set. Deposits will be refunded for sets if returned in good condition within 20 days after bids are opened. Checks or money orders for deposits or furnished as bid guaranty must be made payable to the General Services Administration. Upon request and in discretion of Issuing Office, one set of drawings and specifications will be furnished to builders' exchanges, chambers of commerce and other similar organizations with the understanding that the set will be retained on their premises for inspection by any interested subcontractor or material firm. Further information may be obtained from Business Service Center, General Services Administration, 600 Post Office & Courthouse, Boston 9, Massachusetts, Capitol 3-2669.

Bids: October 4, 1960

Niagara Falls Bridge Commission Lewiston-Queenston Bridge Project United States and Canada

Sealed bids covering Contracts No. 1, No. 2, and No. 3, of the Lewiston-Queenston Bridge Project will be received by the Niagara Falls Bridge Commission at its offices in Niagara Falls, Ontario, Canada, and in Niagara Falls, New York, U.S.A., until 4:00 P.M., Eastern Daylight Time, October 4, 1960.

The three contracts provide for the construction of the Lewiston-Queenston Bridge, a 1000 foot span steel arch over the Niagara River between Lewiston, New York, and Queenston, Ontario, with an overall length of 1600 ft. including steel and concrete approach spans.

Invitations to bid on other contracts for filled approaches and terminal construction at both ends of the bridge will follow.

Bids on Contract No. 1, Canadian Substructure, will be received in the Commission's office in Canada. Bids on Contract No. 2, United States Substructure, and Contract No. 3, Superstructure, will be received in the Commission's office in the United States.

The bid on Contract No. 1 will be in Canadian Dollars. The bids on Contracts No. 2 and No. 3 will be in U. S. Dollars. The work on Contract No. 1 is wholly in Canada. The work on Contract No. 2 is wholly in the United States. The work on Contract No. 3 is partly in Canada and partly in the United States. Bidders will be required to pay all import taxes and duties in connection with the work.

The work on Contracts No. 1 and No. 2 is to be completed on or before May 31, 1961. The work on Contract No. 3 is to be completed on or before May 29, 1962.

Plans, Specifications, and Bid Forms may be seen at the office of the Niagara Falls Bridge Commission, Niagara Falls, Ontario, Canada and at the offices of Hardesty & Hanover, Consulting Engineers, 101 Park Avenue, New York 17, New York.

Copies of these documents may be secured at said offices by the deposit of $50.00 per set per contract, $30.00 of which will be refunded upon the return of each set in good condition within one week after award of the contract.

A bid deposit in the form of a certified check for not less than five percent (5%) of the gross bid shall accompany each bid submitted.

Niagara Falls Bridge Commission
C. Ellison Kaumeyer,
General Manager

Bids: October 6, 1960

Brooklyn-Port Authority Piers Piers Nos. 6 & 7 Demolition and Dredging

THE PORT OF NEW YORK AUTHORITY
CONTRACT BP-190.006

Sealed proposals for the demolition of existing Piers 18 and 24 and dredging for Piers Nos. 6 and 7 at the Brooklyn-Port Authority Piers will be received at the office of the Chief Engineer of the Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Thursday, October 6, 1960, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the Office of the Assistant Chief Engineer for Design of the Authority, Room 1115. Documents will be furnished upon deposit of $30.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $30.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract directly to the Authority will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
S. Sloan Colt, Chairman

New York, September 8, 1960

OFFICIAL PROPOSALS

Bids: September 21, 1960

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.,—Pursuant to the provisions of the Highway Law, Public Buildings Law, and Canal Law Article 2, Title 9 of the Public Authorities Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., advanced standard time, which is nine-thirty o'clock A.M., eastern time, on the 21st day of September 1960, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 1, G. L. Nickerson, District Engineer, 353 Broadway, Albany, New York						
Essex, Greene, Rensselaer, Saratoga & Schenectady	FARDC 60-1	Permanent Radar Detector Traffic Counter Stations on S.H. 801, 8384, 610, 5314 & C.R. 30 Project No. HPS-1(17)-A1	....	Installing 5 Radar Detector Traffic Counter Stations	$450 Plans $5	$8,300
Essex (Rte. 73)	RC 60-148	Euba Mills-Keene Valley, Pt. 1, S.H. 8439	4.74	Cable Guide Railing	$2,300 Plans $5	39,000
Greene (Rte. 23A)	RC 60-157	Tannersville-Haines Falls, S. H. 1630	0.15	Asphalt Conc.=0.13 Mi.; Misc Work=0.20 Mi. 3 Span-Conc. Box Culv.=38'	$6,500 Plans $5	112,000
Rensselaer & Saratoga (Rte. 4)	C 60-20 RC 60-166	Troy-Waterford Br. Vill. of Waterford: Third St. & East Broad St., S.H. 9364; City of Troy: Art. Highway (125th St.)	0.14	Repairs to Substructure & Painting Superstruc.	$12,000 Plans $5	118,000
Saratoga (Int. Tr. Rte. 87)	FISH 60-8	Interstate Rte. 502; Malta to Saratoga Springs Project I-87-3(35); U-437(4)	7.89 (10.39 Acc.)	9" Cem. Conc. Pavt. 2 @ 36' & Var.=12.43 Mi.; Misc. Work=0.11 Mi.; Asphalt Conc. 5.74 Mi.; 8 Hg Sep. 7 Prestressed Conc. 368.2'; 142.0'; 142.0'; 142.2'; 139.2'; 382.0'; 330.2'; 1 Comp. Beam 328.8'; 3 Bridges, Prestressed 139.5' and 2 @ 142.0'.	$535,000 Plans $10	9,762,000
DISTRICT No. 2, Lacy Ketchum, District Engineer, 109 No. Genesee Street, Utica 1, New York						
Fulton (Rte. 10)	R.C. 60-151	Stone Arabia-Ephratah, Pt. 2, S.H. 1597; Ephratah-Keeks Ctr., Pt. 2, S.H. 620; Ephratah-Caroga, S.H. 1686	4.71	Asphalt Conc., Type 2A	$8,000 Plans $5	114,000
Fulton (Rte. 10)	R.C. 60-150	Caroga Creek-Canada Lake, S.H. 9039 Canada Lake-Arietta-Piseco, Pt. 1, S.H. 1739	3.09	Asphalt Conc. Type 2A	$6,000 Plans $5	112,000
Hamilton (Rte. 28)	R.C. 60-156	Blue Mountain Lake-Indian Lake, Pts. 1 & 2, S.H. 5704, 5704A; Indian Lake-County Line, S.H. 1100	11.31	Asphalt Conc., Type 1A	$47,000 Plans $5	862,000
Herkimer (Rte. 28)	R.C. 60-149	Columbia-Mohawk, S.H. 472	3.84	Asphalt Conc. Type 1A	$9,000 Plans $5	155,000
Herkimer, Montgomery & Oneida	FARDC 60-2	Permanent Radar Detector Traf. Counter Stations on S.H. 8012, 5028, 5346 and in the City of Utica Project HPS-1(17)-A2	....	Installing 4 Radar Detector Traffic Counter Stations	$300 Plans $5	5,800
Montgomery	M 60-8	Erie Canal, Lock 12-E, Tribes Hill	....	Cleaning and Painting Movable Dam 8	$1,500 Plans $5	29,000
Oneida (Rte. 69)	C 60-19	City of Rome: E. Whitesboro St. Arterial-Fac 58-7	0.46	Chain Link Fencing 6' High	$600 Plans $5	11,000
Oneida (Rte. 233)	R.C. 60-158	Franklin Springs-Kirkland, S.H. 5442; Kirkland Rome, S.H. 8246	0.86	Asphalt Conc., Type 2A=0.79 Mi. Misc. Work=0.07 Mi.	$12,000 Plans $5	213,000
Oneida (Rtes. 365, 26)	R.C. 60-144	Rome Roads, S.H. 564 C.A. Canal Bridge No. E-55	....	Cleaning & Painting Thru Truss 180' Span	$400 Plans $5	7,000
DISTRICT No. 3, Earl E. Towlson, District Engineer, 333 E. Washington Street, Syracuse, New York						
Onondaga, Oswego & Wayne	FARDC 60-3	Permanent Radar Detector Traffic Counter Stations on S.H. 5016, 429, 1516 and in the City of Oswego Project HPS-1(17)-A3	....	Installing 4 Radar Detector Traffic Counter Stations	$400 Plans $5	7,500
DISTRICT No. 4, B. F. Perry, District Engineer, Barge Canal Terminal, Rochester 1, New York						
Monroe (Rtes. 259, 261)	R.C. 60-153	W. Greece-Monitou Beach, S.H. 1281; Hilton Vill., S.H. 851	....	Rehabilitation of 3 Plate Girder Bridges	$3,000 Plans $5	53,000
Monroe, Orleans (Rte. 272)	R.C. 60-161	County Line, S.H. 398 Monroe-Orleans County Line, S.H. 588	5.08	Asphalt Conc.=5.05 Mi. Misc. Work=0.03 Mi.	$16,000 Plans $5	282,000
Ontario (Rte. 21)	R.C. 60-160	Cheshire-McJannetts Hill, S.H. 639; Bristol Springs-Cheshire, Pt. 1, S.H. 8156	6.07	Asphalt Conc.=6.03 Mi. Misc. Work=0.05 Mi.	$50,000 Plans $5	943,000
Ontario (Rte. 88)	R.C. 60-147	Canandaigua-Orleans, S.H. 1278	0.25 (0.08 Acc.)	Asphalt Conc. Type 1A=0.24 Mi.; Double Surf. Treatment=0.08 Mi.; Misc. Work=0.01 Mi.; 1 Bridge-Comp. I-Beam-60' Span	$8,000 Plans $5	148,000
DISTRICT No. 5, E. G. H. Youngmann, District Engineer, State Office Bldg., 65 Court Street, Buffalo 2, New York						
Erie (Rte. 5)	FAC 60-12	City of Buffalo: Fuhrmann Blvd. Art. Highway (Tift Street to Buffalo Skyway) (Contract 1) Project U-750(21)	1.69 (1.14 Acc.)	Grading and Drainage=1.49 Mi.; Asph Conc., Type 2A (Acc.)=1.14 Mi.; Misc. Work=0.20 Mi.	$70,000 Plans $5	1,270,000
Erie (Rte. 188)	FARC 60-154 FASS 60-13 FASSRC 60-14	Gardenville-Williamsville, Pt. 2, S.H. 1626; Walden Ave., C.R. 244; Walden Ave.-Ellicott Road, C.R. 318, FASS 52-13. Project U-1080(5); S-380(3)	3.22	Asph. Concrete=2.57 Mi.; 9" Cem. Conc.—24' Widening=0.40 Mi.; Miscellaneous Work=0.25 Mi.	$43,000 Plans $5	835,000
Niagara	FASH 60-11 FARC 60-159	Hyde Park Boulevard, S.H. 58-21; Hyde Park Boulevard Extension. Project U-461(12)	0.31	Asphalt Conc. Type 2A=0.27 Mi. Misc. Work=0.04 Mi.	$9,000 Plus $5	157,000
DISTRICT No. 6, William J. Dennis, District Engineer, State Office Bldg., 30 West Main Street, Hornell, New York						
Allegany	FASS 60-12	Scio-Vandermark Creek Road, C.R. No. 10 Project No. S-789(5)	0.34	Asphalt Concrete Comp. I-Beam Bridges; 2 Spans; Total 164.0'	$11,000 Plans $5	199,000
DISTRICT No. 7, Robert W. Sweet, District Engineer, 444 Van Dusee Street, Watertown, New York						
Clinton (Int. Tr. Rte. 87)	FISH 60-10	Int. Rte. 502, Section 7D-1 (Miner Farm Road to Ridge Road) Project I-87-4(8)	5.42 (0.39 Acc.)	Asphalt Conc. Type 1A=5.79 Mi.; Misc. Work=0.02 Mi.; 1 Hgs Prestressed Conc Beam, 7 Spans—Total 370.0'; 2 Reinf Conc. Twin Box Culv. Each 2 @ 12'	$170,000 Plans $5	2,895,000
DISTRICT No. 8, Kurt G. Rauer, District Engineer, Pleasant Valley Road, Poughkeepsie, New York						
Columbia, Dutchess, Orange, Ulster & Westchester	FARDC 60-4	Permanent Radar Detector Traf. Counter Stations on S.H. 762, 135, 537, 453, 8256, 8408, 53-15, 308, 231, 5372, 1456, City of Poughkeepsie and on the Hutchinson River Parkway. Project HPS-1(17)-A8	....	Installing 13 Radar Detector Traffic Counter Stations	$1,000 Plans $5	18,000
Orange (Rte. 17)	R.C. 60-155	Tuxedo-Harriman, Pt. 1, S.H. 8258	2.25	Asphalt Concrete	$29,000 Plans $5	524,000
Orange (Rte. 84)	R.C. 60-152	Slate Hill-Unionville, S.H. 160	0.28	Asphalt Concrete Comp. I-Beam-2 Spans @ 66' Each	$12,000 Plans $5	202,000
Rockland (Rte. 303)	FARC 60-11	New Jersey State Line-Congers, Pt. 1, S.H. 1898; New Jersey St. Line-Congers, Pt. 2, S.H. 8448 Project U-528(8)	1.19 (0.50 Acc.)	9" Cem. Conc. Pavt. 2 @ 24' & Var.=1.48 Mi.; Asphalt Conc.=0.16 Mi.; Misc. Work=0.05 Mi.	$43,000 Plans $5	781,000
DISTRICT No. 9, Joseph C. Frederick, District Engineer, 71 Frederick Street, Binghamton, New York						
Sullivan	FARDC 60-5	Permanent Radar Traffic Counter Station on County Road 53. Project HPS-1(17)-A9	....	Installing a Radar Detector Traffic Counter Station	$70 Plans $5	1,350

(Continued on following page)

OFFICIAL PROPOSALS

OFFICIAL PROPOSALS

OFFICIAL PROPOSALS

(Continued from preceding page)

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 10, Austin M. Sarr, District Engineer, 325 W. Main Street, Babylon, L. I., New York						
New York & Bronx (Int. Tr. Rte. 95)	FICBE 60-3	Interst. Route Conn. 511; Cross Bronx Expressway Contract 1B, (Alexander Hamilton Bridge Superstructure) Project I-95-1(40)	0.29	Alexander Hamilton Bridge Superstructure	$310,000 Plans $5	5,639,000
Nassau & Queens	FARC 60-164	Jericho Turnpike Pt. 1, Jamaica Ave., S.H. 1831; Jericho Turnpike, Pt. 2, (Jamaica Ave.), S.H. 1940; Jericho Turnpike, S.H. 9020; Jericho Turnpike-Floral Park Vill. S.H. 60-20. Project U-1000(7)	2.35	Asphalt Concrete=1.99 Mi. Misc. Work=0.36 Mi.	$150,000 Plans $5	2,771,000
Queens (Int. Tr. Rtes 78 & 495)	FICE 60-2 FIHHE 60-6	Int. Rte. Conn. 513, Clearview Expressway (73rd. Ave. to Willets Point Blvd.); Int Rte. Conn. 514, Horace Hardin Expressway, Sec. 2 (190th St. to Oceania St.) Project I-78-1(52); I-495-1(43)	4.72	Roadside Development	$20,000 Plans $5	353,000

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal-Aid Highway Act of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage), Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

If the deposit is $10.00 or more, full refund for one copy of the plans and specifications will be made to a bidder for the particular project, if such plans and specifications are returned in good condition within 30 days after the award of the contract or after the rejection of the proposal. The successful bidder is not required to return the copy of the plans and specifications in order to be entitled to such refund. If the deposit is $10.00 or more, partial refund will be made for the return of all other copies of plans and specifications in good condition within 30 days after the award of the contract or the rejection of the proposal.

Special attention of bidders is called to "Information for Bidders" in the Public Works Specifications, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as Amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bond shall conform to the provisions of the Highway Laws, as set forth in "Information for Bidders".

The right is reserved to reject any or all bids.

J. BURCH McMORRAN

SUPT. OF PUBLIC WORKS

Bids: September 27, 1960

General Construction of CHA Project Illinois 2-37, Stage III

The Chicago Housing Authority invites properly qualified bidders to submit proposals for all labor and material required to complete the General Construction of CHA Project Illinois 2-37, Stage III. The work includes eight 16-story elevator-type apartment buildings containing 1,264 dwelling units, a Boiler House, Community Building, Management-Maintenance Building, the underground utilities and related site improvements, all in the general area bounded by West 47th Street, South State Street, West 51st Street and the railroad tracks west of South Federal St.

Bids will be received until 2:00 p.m. (local time) on September 27, 1960, by mail or by hand in Room 1500 of the Chicago Housing Authority, 608 South Dearborn Street, Chicago 5, Illinois, immediately after which time and at such place all bids will be publicly opened and read aloud.

Bid documents including plans and specifications may be obtained on or after August 30, 1960, by depositing $75.00 in the form of a cashier's check, certified check or telegraphic or postal money order with Shaw, Metz and Associates, Architects and Engineers, 208 South LaSalle Street, Chicago 4, Illinois.

Bids: September 14, 1960

Sale of Substation Equipment and Construction Power Transmission Line Materials

POWER AUTHORITY OF THE STATE OF NEW YORK
ADVERTISEMENT FOR PROPOSALS

The Power Authority of the State of New York is offering for sale, to the highest bidder, the following substation equipment and transmission line materials:

One (1) Metalclad 13.8 KV Outdoor Type Switchgear.
Six (6) 15 KV Load Break Switches.
Twelve (12) 15 KV Lightning Arrestors.
Six (6) 115 KV Fuse Mountings, single hook stick operated, complete with power fuses.
Four (4) 115 KV Disconnect Switches.
One (1) Lot of Transmission Line Material.

These items were placed in service June 1955, in a transmission line and substation used to supply construction power to the St. Lawrence Power Project, and removed from service December 1958. They have now been disassembled and moved to areas at the Robert Moses Power Dam, which is located approximately 10 miles north of Massena, N. Y., where they may be inspected.

The power circuit breakers, the storage battery and the rectified type battery charges for the switchgear, presently stored inside plant buildings, will be moved by the Power Authority to the ground floor level for loading by the buyer.

Brief descriptions of the items which are offered for sale, and proposal forms for use in bidding are available from Uhl, Hall & Rich, Post Office Box 68, Massena, New York. The descriptions are derived from the original purchase specifications and no guarantee as to the "as is" condition is implied or will be given. Bidders should inspect the equipment and material at the site before submitting proposals. All items will be sold on a "Where is, as is" basis and no claims for adjustment of sale price will be considered on account of any of the equipment being damaged, deteriorated or altered.

Bids will be considered for all or any of the items or for such combination of items as the bidder may elect to make. The right is reserved to make award on any bid or combination of bids and to reject any or all bids.

Bids will be received only in writing and must be received prior to 12:00 Noon E.D.S.T., September 14, 1960, in order to be considered. Bids or requests for additional information should be addressed to:

UHL, HALL & RICH, Engineers for
the Power Authority of the State of N. Y.
P. O. Box 68
Massena, New York

Successful bidders will be required to make payment in full within ten (10) days after the acceptance of their offers and to remove from Authority Property within thirty (30) days the item or items purchased.

W. S. CHAPIN
GENERAL MANAGER

Bids: September 21, 1960.

Beach Protection Contract B. P. 60-77

NOTICE TO BIDDERS

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, NEW YORK—Pursuant to the provisions of the Building Law and Highway Law, sealed proposals will be received, until 10:30 A.M., D.S.T., on September 21, 1960 by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Gov. Alfred E. Smith State Office Building, Albany, New York for:

Contract B.P. 60-77 for
Beach Protection (Four Stone Groins) at Far Rockaway, The Rockaways, City of New York, Queens County, New York

Engineer's Estimate for B.P. 60-77 is $870,000. Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts, 12th Floor, The Gov. Alfred E. Smith State Office Bldg., Albany, New York.
(b) Department of Public Works, 270 Broadway, New York City, New York.
(c) In addition to the above mentioned offices, plans, maps and specifications for Contract B.P. 60-77 may be examined and obtained at the office of Mr. Austin M. Sarr, District Engineer, 325 West Main Street, Babylon, L. I., New York.

The deposit for Plans and Proposal Forms for Contract B.P. 60-77 is $10.00. A refund in full will be made to bidders for return of one set in good condition within 30 days of award or rejection of bids; a partial refund for all other sets in good condition, similar period, will be made.

Proposals for Contract B.P. 60-77 must be submitted in a separate, sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Commissioner of Taxation and Finance" in the amount of $45,000. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Building Law and Highway Law as set forth in "Instructions to Bidders" in the contract specifications.

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPERINTENDENT OF PUBLIC WORKS

Bids: September 26, 1960

Pavement Repairs of Runways and Taxiways

THE PORT OF NEW YORK AUTHORITY
NEWARK AIRPORT
CONTRACT O & M-595

Sealed proposals for repairing pavement of runways and taxiways at Newark Airport will be received at the office of the Department of Purchase and Administrative Services of The Port of New York Authority, Room 900, 111 Eighth Avenue, New York 11, New York, until 11:00 A.M. Thursday, September 22, 1960, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Department of Purchase and Administrative Services, Room 900, and copies will be furnished upon deposit of $10.00 per set. Deposit must be delivered to Treasury Department, Room 1001, where a receipt will be issued. The receipt is then to be delivered to the Department of Purchase and Administrative Services, which will furnish the contract documents. The deposit will be remitted if the documents are returned in good condition, not later than thirty days after the opening of proposals. The deposit will be forfeited if the documents are not returned within thirty days.

THE PORT OF NEW YORK AUTHORITY
S. Sloan Colt, Chairman

New York, September 8, 1960

OFFICIAL PROPOSALS

Bids: September 15, 1960

Walt Whitman Bridge
Contract No. 103

DELAWARE RIVER PORT AUTHORITY
of the
COMMONWEALTH OF PENNSYLVANIA
and the
STATE OF NEW JERSEY
Administration Building
Camden, New Jersey

Sealed bids will be received for Fencing and Miscellaneous Paving for the Philadelphia Approaches of the Walt Whitman Bridge, known as Contract No. 103, at the office of the Executive Director of the Delaware River Port Authority, Administration Building, Benjamin Franklin Bridge Plaza, Camden, New Jersey, until 2:30 P. M., Eastern Daylight Saving Time, Thursday, September 15, 1960, at which place and time they will be publicly opened and read by the Authority.

A more complete description of the work and full information for bidders are given in the Contract Documents and Specifications for this contract, which may be obtained upon deposit of a $10.00 check, which will be remitted upon receipt of bid or the return in good condition of the copies so taken, within thirty days after the opening of bids.

Each proposal must be accompanied by a certified check in the sum of $15,000, payable to the Delaware River Port Authority and drawn upon a National or State Bank or Trust Company having an office or place of business either in Philadelphia, Pennsylvania or Camden, New Jersey, and must not be enclosed with the sealed bid. The surety's consent must be shown. The bidder to whom the contract is awarded will be required to furnish a Performance and Labor and Materialman's Bond in the sum of 100 percent.

The Authority will afford prospective bidders an opportunity to inspect the site of the work.

The Authority reserves the right to waive any informalities in the bids received, to reject any or all bids and to award the contract only to those experienced in this class of work and to the bidder whose proposal is deemed by the Authority to be most advantageous to the public interest.

DELAWARE RIVER PORT AUTHORITY
JOHN M. McCULLOUGH
EXECUTIVE DIRECTOR

Bids: September 29, 1960

Construction of Windom Pumping Station
Town of Orchard Park, N. Y.

Notice is hereby given that sealed bids wil be received in accordance with the law by the Erie County Water Authority until ten o'clock A.M. Eastern Daylight Saving Time on the twenty-ninth day of September, 1960 at the office of the Authority, 338 Ellicott Square Building, Buffalo 3, New York, for furnishing materials and performing the labor for constructing the Windom Pumping Station in the Town of Orchard Park, Erie County, New York, all in accordance with plans and specifications prepared by Buck, Seifert and Jost, Consulting Engineers, 112 East 19th Street, New York 3, New York.

Copies of the plans and specifications may be obtained either from the Erie County Water Authority or from the Consulting Engineers upon deposit of Twenty-Five ($25.00) Dollars, which sum will be refunded upon return of the plans and specifications in good condition within ten (10) days after the date on which bids are received or else the entire deposit will be forfeited.

The work to be done includes all materials and labor, tools, plant and equipment necessary for constructing, installing and completing, ready for operation, a one (1) story waterworks pumping station approximately sixty-eight (68') feet by thirty-six (36') feet in plan, with reinforced concrete substructure and brick superstructure, complete with three (3) electric motor driven centrifugal pumping units; piping; electrical equipment, controls and wiring; heating; plumbing; grading; connecting piping and other accessories and appurtenances.

Each proposal must be accompanied by a certified check payable to the Erie County Water Authority or a bid bond to the favor of the Authority from a reliable surety company authorized to do business in the State of New York and satisfactory to the Authority, in amount equal to ten (10%) percent of the proposal. The certified checks will be retained to pay for any damage or loss to the Authority, or the liability bonds will accrue in case the successful bidder shall neglect or refuse to enter into a contract in accordance with his proposal.

The Authority reserves the right to consider bids for thirty (30) days after their receipt before awarding any contract and the right is reserved to accept any bid or to reject any or all of them.

ERIE COUNTY WATER AUTHORITY
By: WILLIAM J. CARNEY, Secretary.
Buck, Seifert and Jost
Consulting Engineers
Dated: September 8, 1960

Bids: September 15, 1960

Soil Explorations and Foundation Investigations
Contract Spec. No. SM-171

NOTICE TO CONTRACTORS

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of Highway Law, sealed proposals will be received until 10:30 a.m. Advanced Eastern Standard Time on September 15, 1960, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y. for:

SOIL EXPLORATIONS AND FOUNDATION INVESTIGATIONS AT VARIOUS SITES ON ROUTE 17 RECONSTRUCTION, DEPOSIT TO McCLURE IN BROOME COUNTY, WHICH CONSTITUTES CONTRACT SPEC. NO. SM-171.

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany 1, N. Y.
(b) Mr. Joseph C. Federick, District Engineer, New York State Department of Public Works, 71 Frederick Street, Binghamton, New York.
(c) Mr. William Mende, Principal Building Construction Engineer, Department of Public Works, 270 Broadway, New York City.

The deposit for a set of plans, specifications and proposal forms is $5.00. Refunds of deposits for plans, specifications and proposals will be made *only* in case the deposits of individual sets are $10.00 or more, per Chapter 835, Laws of 1960.

The Engineer's Estimate of cost for this work is $16,525.00.

Proposal for this contract must be submitted in separate sealed envelope with the name of the contract plainly endorsed on the outside of the envelope. Proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum of $1,000.00. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instruction to Bidders".

The right is reserved to reject any or all bids. J. BURCH McMORRAN
SUPERINTENDENT OF PUBLIC WORKS

Bids: September 20, 1960

Project 11
Springfield Road Pumping Station

NOTICE TO BIDDERS
FAIRFAX COUNTY WATER AUTHORITY
ANNANDALE, VIRGINIA

Sealed proposals will be received by the Fairfax County Water Authority at the office of the Authority, 7310 Maple Street, Annandale, Virginia, or by mail addressed to the Authority, P. O. Box 91, Annandale, Virginia, until 2:00 P. M. EASTERN DAYLIGHT SAVING TIME, SEPTEMBER 20, 1960, at which time they will be read aloud and contracts awarded as soon thereafter as practicable for the construction of the Springfield Road Pumping Station in Fairfax County, Virginia.

The work comprises the furnishing of all materials and construction of the pumping station and appurtenant work, including the installation of equipment furnished by others.

The pumping station will house one pump of 2 MGD capacity at 105 feet total dynamic head and two pumps of 3 MGD at 120 feet total dynamic head.

The Instructions to Bidders, Proposal, Agreement, Form of Bid Bond, Performance Bond, Plans and Specifications for the work may be examined at the office of the Fairfax County Water Authority, 7310 Maple Street, Annandale, Virginia, and at the office of Greeley and Hansen, Engineers, 14 East Jackson Boulevard, Chicago 4, Illinois. Copies of the Plans and Contract Documents may be obtained upon the deposit of $50.00 for each set, to be refunded upon return of such set in good condition within 10 days after the opening of bids.

Each proposal must be accompanied by a bid bond or a certified check on a solvent bank or trust company, made payable to the Fairfax County Water Authority, in the amount of five per cent of the total amount bid, as assurance that the bid is made in good faith.

Bidders must be registered as Contractors in the Commonwealth of Virginia, as provided by Chapter 7 of Title 54 of the Code of Virginia of 1950.

The Fairfax County Water Authority reserves the right to waive any informalities in or to reject any or all bids and to accept the bid which it deems most favorable to the interests of the Authority after all bids have been examined and canvassed.

FAIRFAX COUNTY WATER AUTHORITY
By: James J. Corbalis, Jr.
Engineer-Director

August 29, 1960

Bids: September 15, 1960

Benjamin Franklin Bridge
Contract No. 21-G

DELAWARE RIVER PORT AUTHORITY
of the
COMMONWEALTH OF PENNSYLVANIA
and the
STATE OF NEW JERSEY
Administration Building
Camden, New Jersey

Sealed bids will be received for Paving Repairs to the Benjamin Franklin Bridge, known as Contract No. 21-G, at the office of the Executive Director of the Delaware River Port Authority, Administration Building, Benjamin Franklin Bridge Plaza, Camden, New Jersey, until 2:30 P. M., Eastern Daylight Saving Time, Thursday, September 15, 1960, at which place and time they will be publicly opened and read by the Authority.

A more complete description of the work and full information for bidders are given in the Contract Documents and Specifications for this contract, which may be obtained upon deposit of a $10.00 check, which will be remitted upon receipt of bid or the return in good condition of the copies so taken, within thirty days after the opening of bids.

Each proposal must be accompanied by a certified check in the sum of $5,000, payable to the Delaware River Port Authority and drawn upon a National or State Bank or Trust Company having an office or place of business either in Philadelphia, Pennsylvania or Camden, New Jersey, and must not be enclosed with the sealed bid. The surety's consent must be shown. The bidder to whom the contract is awarded will be required to furnish a Performance and Labor and Materialman's Bond in the sum of 100 percent.

The Authority will afford prospective bidders an opportunity to inspect the site of the work.

The Authority reserves the right to waive any informalities in the bids received, to reject any or all bids and to award the contract only to those experienced in this class of work and to the bidder whose proposal is deemed by the Authority to be most advantageous to the public interest.

DELAWARE RIVER PORT AUTHORITY
JOHN M. McCULLOUGH
EXECUTIVE DIRECTOR

Bids: October 30, 1960

Tender No. 193/60
For Submission of Offers for Consulting Engineers for the Construction of New Concrete Wharves at Margil and Ashar-Basrah.

REPUBLIC OF IRAQ
IRAQI PORTS ADMINISTRATION,
BASRAH

The Iraqi Ports Administration invite tenders, from Architectural Engineering Firms and Consulting Engineers with previous experience in the construction of wharves, for the submission of offers for Consulting Engineers to draw up plans and charts for the construction of new concrete wharves at Margil and Ashar-Basrah to replace some of the old wharves, and the improvement of the Railway lines, sheds and storages existing at the wharf areas. Tender forms and drawings may be obtained from the Inspectorate General of Ports and Navigation at the Ministry of Communications, Baghdad, or from the Mudir, Tenders and Purchases Department at the Iraqi Ports Administration, Margil, Basrah, or from the Iraqi Republic Representatives abroad, which will be issued gratis. The tender closes at 1.00 p.m. on Sunday the 30th October 1960.

Tenders are available at the Embassy of Iraq, 2135 Wyoming Avenue N.W., Washington, D. C.

EMPLOYMENT NATIONAL COVERAGE OPPORTUNITIES

DISPLAYED RATE:

The advertising rate is $39.20 per inch for all advertising appearing on other than a contract basis. Frequency rates quoted on request.

An advertising inch is measured 7/8" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

SEPTEMBER 22ND ISSUE CLOSES SEPTEMBER 12TH

UNDISPLAYED RATE:

$2.40 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Position Wanted ads take ½ of above rate.

Box numbers—count as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Not subject to agency Commission.

Send NEW Ads and Inquiries to Classified Advertising Division or ENGINEERING NEWS-RECORD, P. O. Box 12, N. Y. 36.

ADDRESS BOX NO. REPLIES TO: Box No.
Classified Adv. Div. of this publication.
Send to office nearest you.
NEW YORK 36: P. O. Box 12
CHICAGO 11: 520 N. Michigan Ave.
SAN FRANCISCO 4: 68 Post St.

• POSITIONS VACANT

Field Supervisor. Large established midwest consulting firm has permanent position in building construction supervision for thoroughly qualified and experienced man. Mechanical engineer preferred. Moving expenses paid. Send complete resume to P-4833, Engineering News-Record.

Civil Engineer, Graduate, with experience as project engineer in charge of design of urban and rural highways, streets and other municipal projects for consulting engineering firm. Location Southwest. P-5055, Engineering News-Record.

Estimator—Midwestern construction and engineering firm has opening for qualified heavy construction estimator. Engineering degree necessary. Permanent position for right man. Salary commensurate with ability. P-5165, Engineering News-Record.

Surveyors, Sanitary Engineer, Computers, Draftsmen. Located Southeastern Pennsylvania. Experienced Chief of Party for municipal, property and topographic surveying. Computers and draftsmen for property surveys, subdivision design, municipal design and planning. Engineer and draftsman for design of water and sewer systems and treatment facilities. Write P-5167, Engineering News-Record.

Wanted—Licensed Engineers competent to design and prepare plans for Sewage Treatment Plants. State age, experience, salary requirements, when can report, references. Positions permanent. P-4972, Engineering News-Record.

Wanted—Engineers experienced in design of Water Works, pipe laying, general construction. State age, experience, salary requirements, when can report, references. Positions permanent. P-4977, Eng. News-Record.

Senior Cost Engineer. Must be familiar with the Uniform System of Accounts for Electric Utilities. Duties will consist of analyzing completed major construction projects for an Electric Utility. Experience with the Federal Power Commission or a State Public Service Commission would be desirable. Some experience with the Property Record Department of any Electric Utility would also be an asset. Please send complete information on experience, references, salary requirements, and availability. Indianapolis Power & Light Co., 25 Monument Circle, Indianapolis 6, Indiana, Employment Division.

Assistant To City Engineer. Salary to $6,588. Fringe benefits. Opportunity for varied design and construction experience. Large city planning, street, sewer and expressway programs under way. Write City Manager, Zanesville, Ohio before November 1.

Estimator—Commercial, Industrial and Public Buildings. Engineering background desired. Opportunity for advancement. Please give experience resume and references. Kuhn Construction Co., Charleston, West Virginia.

Draftsmen, Structural-Experienced checkers and detailers of structural steel shop drawings. Permanent position. Fink and Zwecker Co., 1100 Crescent Ave., N.E., Atlanta 9, Ga.

Superintendent—Heavy construction. Graduate Engineer. Experienced in heavy concrete. Permanent position. P-5203, Engineering News-Record.

• POSITIONS VACANT

Highway Bridge Designer, established Southwest consulting firm, min. 10 yrs. exper. P-5222, Engineering News-Record.

Wanted Engineers—Five years general experience, married without children, for Pitometer Surveys of municipal water distribution systems. Permanent position with frequent location changes. Salary open. Profit Sharing. The Pitometer Associates, 50 Church Street, New York City.

Building Supt. for well established General Contractor operating in three state Mid-west area. Excellent opportunity for superintendent thoroughly grounded in form work and management of large sized institutional and commercial work. Please reply giving experience record, salary desired, etc. P-5201, Engineering News-Record.

Qualified personnel needed for planning & construction of military facilities. Apply to the Area Engineer, U. S. Army Engineer District, New York, Plattsburgh Area Field Office, P. O. Box 161, Plattsburgh, N. Y., Phone: JOrdon 3-0820.

Ground Control Field Engineer, $6828-$8328, college degree in Civil Engineering plus highway survey experience in horizontal and vertical control survey work of high-accuracy standards, including the use of the theodolite, electronic distance measuring devices, and a knowledge of the computation and adjustment procedures involved. Registration eligibility desirable. United States Citizenship required. Minnesota Civil Service Dept., 122 State Office Building, St. Paul 1, Minn.

Bridge and Highway Supt. for well established Mid-west contractor. Applicant must be capable of handling complete phases of joint venture highway work and must have a detailed knowledge of bridge formwork including wet piers. Excellent opportunity and salary for qualified man. Engineering background preferred. Please reply giving experience record, salary desired, etc. P-5207, Engineering News-Record.

Engineer, R & D, graduate CE or ME, age 25-40. Work includes technical writing, consultation, research and development relating to the curing of concrete products with steam at high pressure. Permanent position. Applicants furnish photo and complete resume including salary desired in first letter. Location Washington, D. C. P-5219, Engineering News-Record.

Engineer, Division of Inspections. Prefer young graduate engineer with administrative ability to take complete charge of rapidly expanding division. Knowledge of building, plumbing and electrical codes desirable. Starting salary $6500. Submit complete personal data to Mr. W. G. Brady, Town Hall, Fairfax, Virginia.

• POSITIONS WANTED

Chief Estimator-Project Manager — Fully qualified to handle work from bidding stage to completion. Best of references. Building Construction, Heavy Construction, Sewage and Water Treatment Plants PW-5011, Engineering News-Record.

Superintendent 41, BSCE., Reg. Sound experience in general construction, estimating and layout, office work. Want opportunity with medium size progressive organization. PW-5157, Engineering News-Record.

Civil—Structural Engineer, degree. 15 years design experience in all types of structures. Reinforced concrete, structural steel, prestressed concrete. Desire a position. Available at a notice. PW-5146, Engineering News-Record.

• POSITIONS WANTED

Land Development Engr.—Heavy experience in design and construction of sub divisions including land use, utilities, roads, golf courses, etc. seeks administrative position with developer or contractor. Recently returned from South America and am free to relocate. Age: 33, married. PW-5115, Engineering News-Record.

Manager of Construction—twenty-five corporate engineer in charge of profitability analysis, cost estimating, scheduling, construction supervision and cost control for major process industry projects. On-time completions, minimum costs, smooth start-ups. PW-5133, Engineering News-Record.

Const. Manager-Superintendent: Registered Civil Eng. Connecticut Member ASCE. 30 years experience on general and heavy const. last 15 years at high level management and supervision covering design, contracting and completion of industrial and institutional buildings, housing projects, oil field facilities, pipe lines, pumping stations, refinery, roads and airfields. 15 years Latin American experience dealing with government officials and national personnel. Fluent Spanish. Location desired overseas but will relocate anywhere. R. Salmon, RFD Petersburg, New York. Tel. Hoosick Falls 1159-R.

Executive, Manager, Engineer (General), age 47, BSCE, 25 yrs exp. all const. categories, 10 yrs as Deputy Installation Engineer at large Air Force Base directing the Maintenance, Operation, Programming, Planning, Engineering, Construction, Management, Fire Protection, and Crash Rescue activities. Desire to locate with aggressive company having gov. contract for similar responsibilities state side or overseas. Available September 30, or sooner. Resume furnished on request. $20,000 + exp. PW-5087, Engineering News-Record.

Engineering Executive. Wide industrial, chemical and civil experience; all phases administration and management. Organize and direct large design jobs or work in consulting and exec. asst. capacities. Proposals, reports, contracts, liaison, trouble shooting. P.E. in 5 States. PW-4725, Engineering News-Record.

Construction Engineer, Contract Administrator—BSCE—age 25—four years experience in engineering construction—supervision, inspection, contract administration—prefer foreign assignment—military obligations completed—available 1 November. PW-5163, Engineering News-Record.

Executive: Excellent legal-construction background, exp. all phases construction field & central office, administrator, mgr, atty, govt contracts, employed, female. PW-5145, Engineering News-Record.

Project Manager or Superintendent, 25 years experience in highways and airfields const. Capable and qualified to do your job, preferably dirt. PW-5150, Engineering News-Record.

Project Manager-Grad. C.E., 17 years experience general and heavy construction, desires position in southwest or south. PW-5149, Engineering News-Record.

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(Continued on opposite page)

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That Missile Base Lag

IT HAS TAKEN FAR TOO LONG for everyone from the Secretary of Defense to the workers on the nation's missile bases to agree that there is a lag in construction and that certain things must be done to catch up.

A construction program the size of this missile base work does not get six months behind schedule—as has been claimed—overnight. When it is six months behind schedule, as it was first reported to be in July, it must once have been five months behind, four months, three, two and one month behind. And yet, only six months ago, when all the fuss was about a claimed lag in production of the missiles themselves, nobody said anything about the bases.

Nobody, then, seemed even to be thinking about the bases very seriously—in relation to the attention they're getting today. Fact is, at the time of all the talk of missile production lag, ENR posed the question: How about the bases? Pentagon officials denied charges that the base-building program was behind schedule. They were reported as saying the program was not being held back by construction delays; it was on schedule, although some completion dates had been moved back (ENR Feb. 18, p. 21).

Now if the program was on schedule in February, and by July construction was six months behind, what could have happened in that five months? Did we ask the wrong people, get the wrong answers in February? Or was official Washington just not sufficiently aware of or concerned with where the base-building program stood at that time?

Actually, it was not until June that missile base construction forced itself on the attention of top-level officials in Washington. Some local publicity given the strange allegations of a former employee at Offutt Air Base, near Omaha, brought Secretary of the Army Wilber Brucker to order an investigation. Builders of the missile base at Offutt bore the brunt of the publicity, but the implication was that base construction everywhere had somehow, suddenly, lagged far off schedule. Although a base-by-base tabulation of schedules (ENR July 21, p. 25) didn't look that bad, the program was then, and even now, widely publicized as being six months behind.

At the end of July Secretary of Defense Thomas Gates summoned base builders and architect-engineers to Washington along with missile manufacturers; labor representatives were invited, too, but didn't make it. Secretary Gates made his point, forcefully if belatedly: No bases, no installed missiles, no deterrent—and deterrence is basic to our whole defense policy. He asked the engineers and constructors for their suggestions. And they have since made these points: Give us fewer changes, speedier payments, coordinated inspection, better specifications, cooperative labor, fewer bosses—and bosses with more authority to make decisions right on the jobsite.

It has been a long time coming, but there seems now to be a new awareness, from Washington to the jobsites, that missile base construction is not business as usual; standard operating procedures just won't do. The awareness is evidenced in a streamlined Air Force command; in the appointment of a Corps of Engineer missile czar, Brig. Gen. Alvin C. Welling, whose authority is already being felt. This same awareness is voiced by the base builders in their letters of suggestions to Secretary Gates (ENR Aug. 18, p. 21). They recognize the rigors of this work, stand ready to be prequalified to bid on it, and suggest that strict emergency procedures should prevail.

If this is agreed, much has been accomplished. And if the program lags, let's get on with it.

Indoor Athletics

ENGINEERING PROGRESS is bringing changes in the nation's favorite pastime—attending ballgames. First, advances in electric lighting permitted baseball and football to be played at night. Now, economical construction of long-span roofs will allow games to be played in all kinds of weather while spectators watch in comfort. The rain check is on its way out.

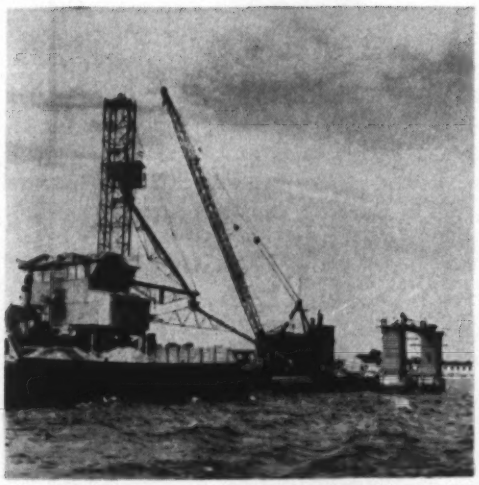
Houston and Dallas-Ft. Worth are planning to build air-conditioned, enclosed stadiums if they receive major league baseball franchises (ENR Sept. 1, p. 17). The dome roofs contemplated will span about 700 ft. With a rise of about 180 ft, they will clear the playing field by more than 200 ft—higher than a baseball has even been thrown or hit. Other stadiums being planned, such as New York's proposed Flushing Meadow project, will be designed structurally for future installation of a roof.

Spans of these Texas domes may equal or exceed the present world's record of 720 ft, held by the Palace of Expositions in Paris (ENR Apr. 17, 1958, p. 45). However, that dome is of thin-shell concrete construction, whereas the contemplated roofs appear likely to be built with steel or aluminum framing and plastic or aluminum panels.

Design and erection of these huge domes will be a spectacular achievement. Yet, if all such domes are to be fixed, converting outdoor sports into indoor, one cannot consider this new development without mixed emotions—pride in the progress of structural engineering, but regret that ballgames in the open air are on their way out.

Perhaps, however, one need not be so pessimistic. Stadium roofs could be made to open in good weather, as is being done for the Pittsburgh Auditorium. This would be even more in line with present engineering capabilities and at the same time the good old days of outdoor ballgames could be preserved.

Throgs Neck Bridge - Owner: Triborough Bridge and Tunnel Authority; Consultants: Ammann & Whitney, Emil H. Praeger, E. Lionel Pavlo; Contractors for Substructure Merritt, Chapman & Scott Corp., Steers-Snare Joint Venture, Fehlhaber Corp.; Contractor for Paving: Horn Construction Co. and Queens Structures Corp. **Verrazano-Narrows Bridge** - Owner: Triborough Bridge and Tunnel Authority; Consultants: Ammann & Whitney, Emil H. Praeger; Contractor for Tower Piers: Steers-Snare Joint Venture.



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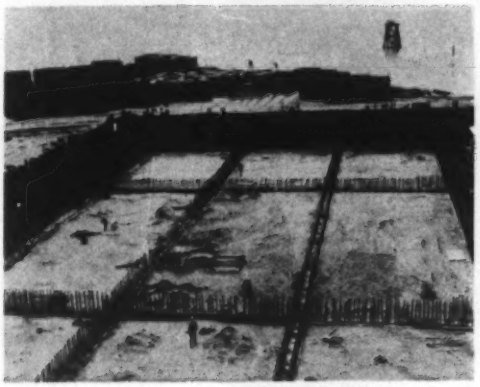

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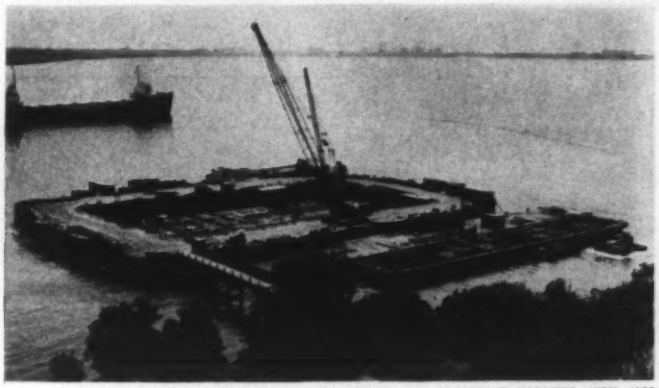

VERRAZANO-NARROWS, JULY, 1960

PLASTIMENT reduces shrinkage, controls rate of heat development

The two largest suspension bridges now under construction in the United States, stand on Plastiment concrete substructures. The Verrazano-Narrows Bridge, connecting Staten Island and Brooklyn, will ultimately span 4,260 ft. between towers to become the longest suspension bridge in the world. The nearly completed Throgs Neck Bridge spans 1,800 ft. between towers and stretches 2,910 ft. between anchorages on Long Island and the Bronx.

Plastiment Retarding Densifier reduced the rate of internal heat development in massive sections of the critical substructures and reduced shrinkage. The use of Plastiment in the tremie concrete improved flow characteristics and minimized the development of laitance. Rapid strength gain was a bonus to the contractor.

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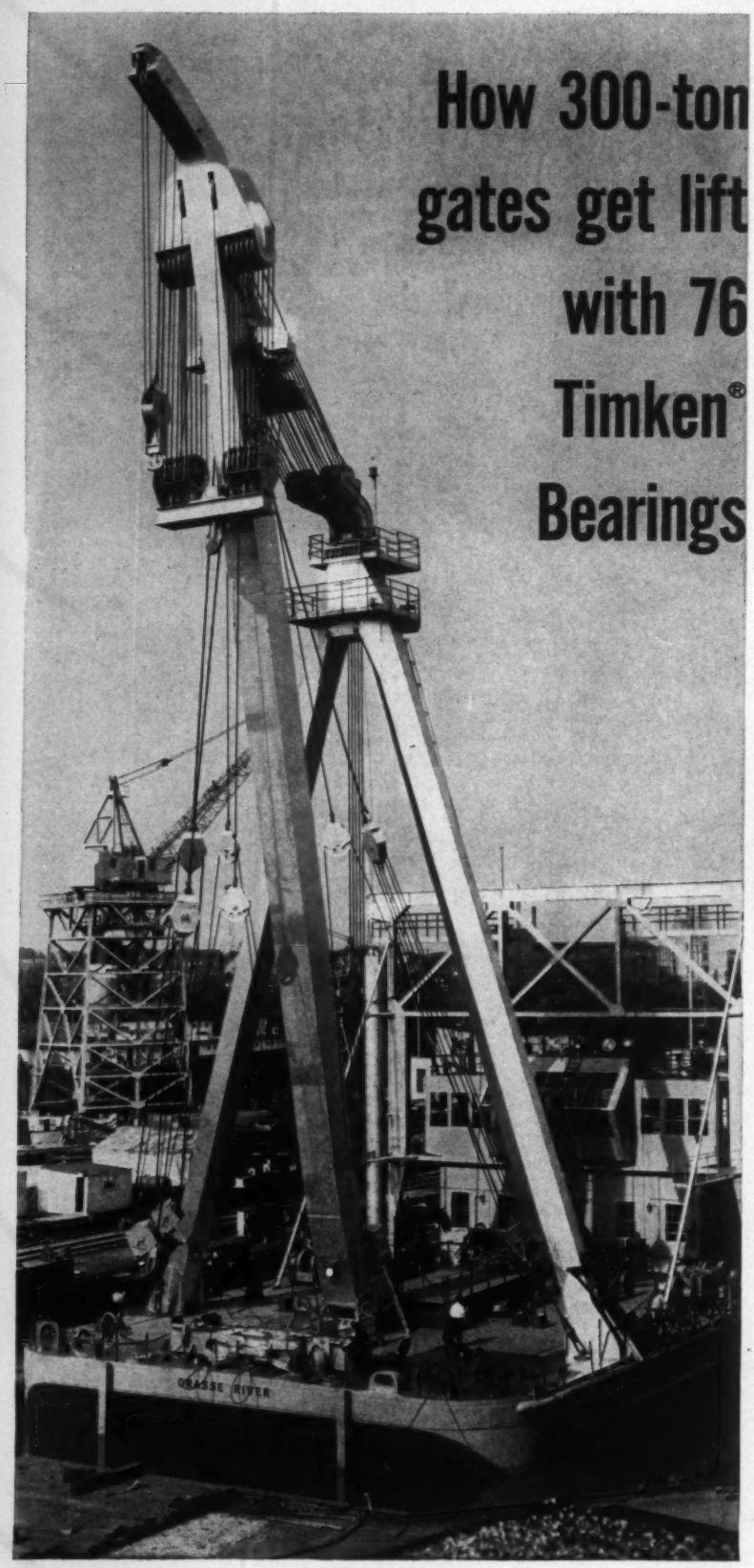

Here's a lift job to make your eyes pop. This gate lifter barge hoists the St. Lawrence Seaway's 300-ton lock gates for maintenance work. Strain is great on the 72 hoisting sheaves. To take it, McKissick Products Co. of Tulsa, Okla., the sheave builders, mounted them on Timken® tapered roller bearings. Sheaves were installed by the American Ship Building Co. of Cleveland, O. And a Timken bearing is used in the main hook thrust position to support the entire 300-ton load. Timken bearings are also used in the derrick head-Rooster.

The tapered design of Timken bearings lets them take all the loads, *both* radial *and* thrust. Maximum sheave rigidity and accurate sheave alignment are provided by the TDO type sheave bearings with their built-in, large, effective bearing spread distances. And because of Timken bearings' true rolling motion, sheaves turn easily, dependably, even under heavy overloads.

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